T-MINUTE REPORT
RT AFTER PAGE 64

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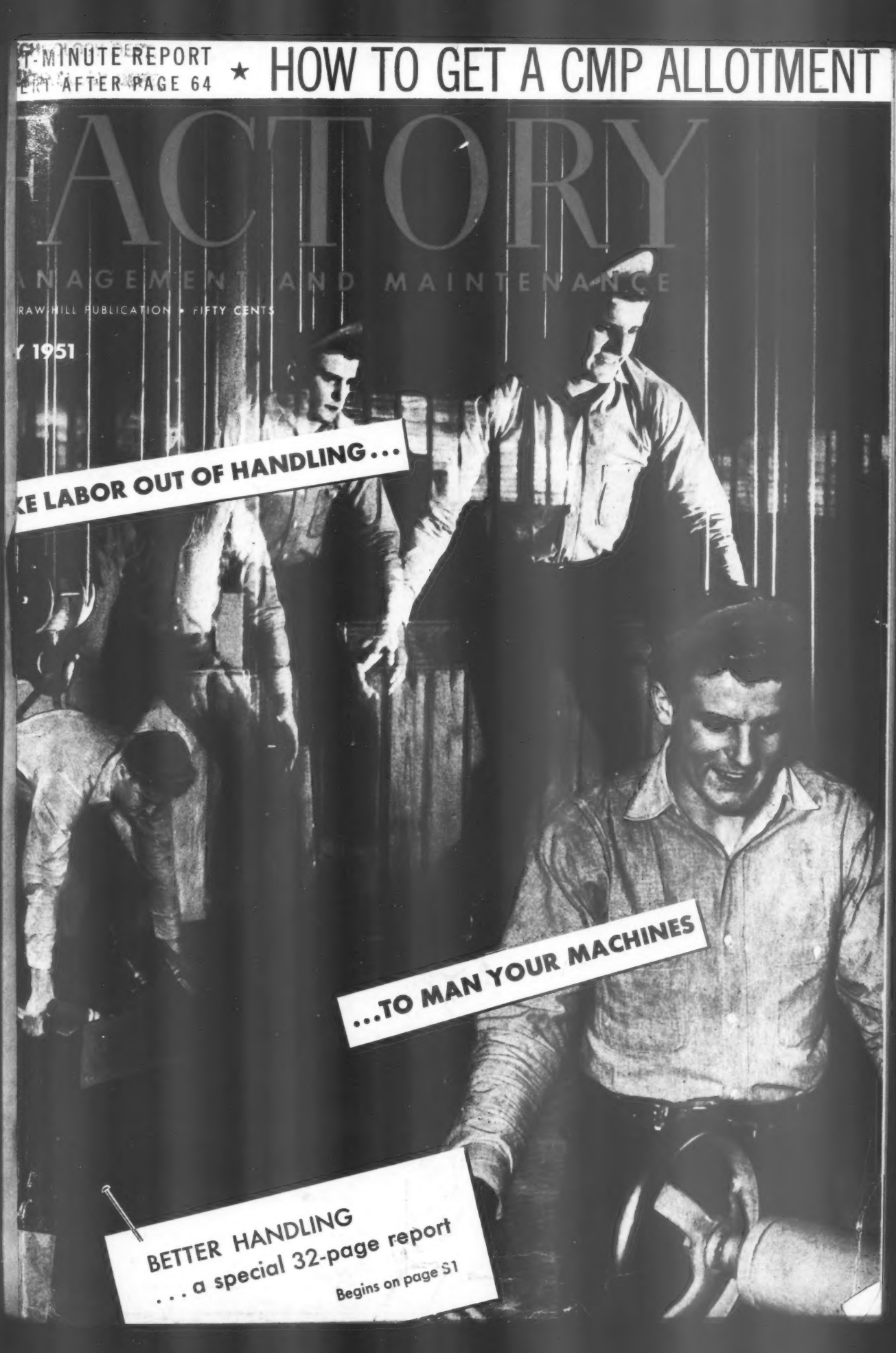

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... a special 32-page report
Begins on page 51

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R v.109 Pt May - Aug. 1951

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MAY 1951

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78 **LEAH PALKEY WAS SURE TO MAKE GOOD ON HER** new job at Soreng Manufacturing Company. And, like most new people at Soreng, she's sure to stay. That's because a testing program helps pick 'em right.

81 **YOU CAN GET OFF TO A FLYING START TOWARD** better handling if you listen in on this frank and earnest conversation between Fred, who is doing an alert handling job, and Joe—who has a lot to learn about modern handling methods that save manpower, speed production.

88 **LIKE JOE, YOU MAY NEVER HAVE THE TIME TO** visit the Formfit plant for ideas. But you do have the time to do your visiting through the eyes of a FACTORY editor. That's why we know you'll give three cheers for the ten case studies that begin on page 88.

114 **PLANT OF THE YEAR IS WHAT THEY'RE CALLING** the new Upjohn plant out in Kalamazoo. You may feel that way, too, when you take a look.

120 **WHY MAKE THE SAME OLD MISTAKES YOU MADE** last time? Why not check up now on your in-plant feeding and be sure you're doing it as well as the other fellow. A major survey gives you the low-down.

126 **TUCKED IN BETWEEN PRINCIPLES AND PRACTICES** at Chatham Manufacturing Company you're sure to find many, many money-saving ideas. By a man who sees both sides of the question—because he's not only plant engineer but also vice president and general manager.

130 **NUMBER 9 IN A SERIES ON WHAT'S NEW IN THE** electrical equipment so vital to efficient operation.

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THIS MONTH'S COVER. TAKE YOUR MEN OUT OF handling and put them in production. The setting, Yale & Towne's new Philadelphia plant. The photographer was Tom Holloway.

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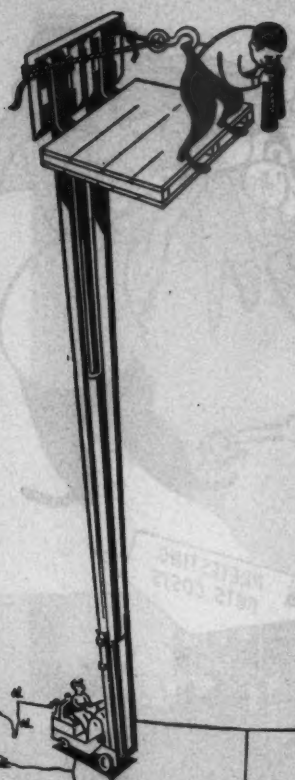

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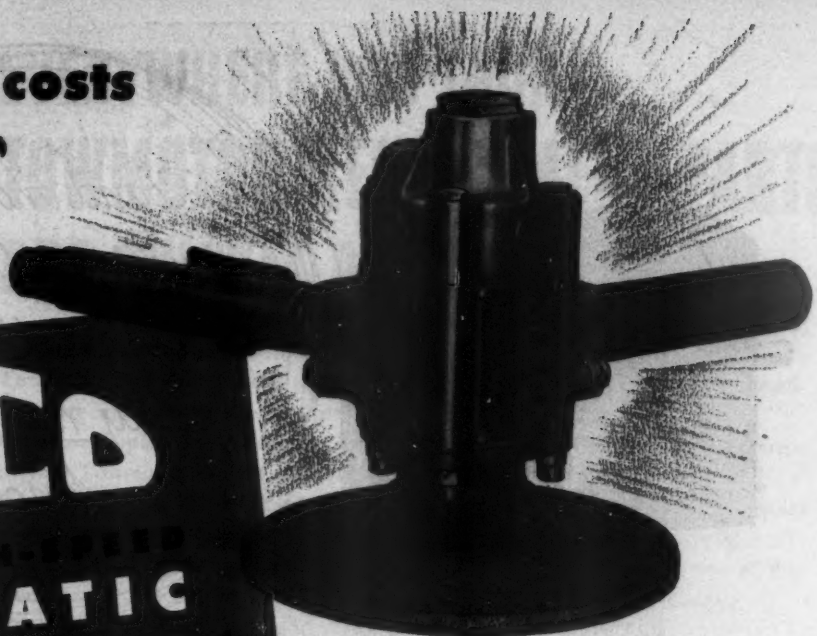

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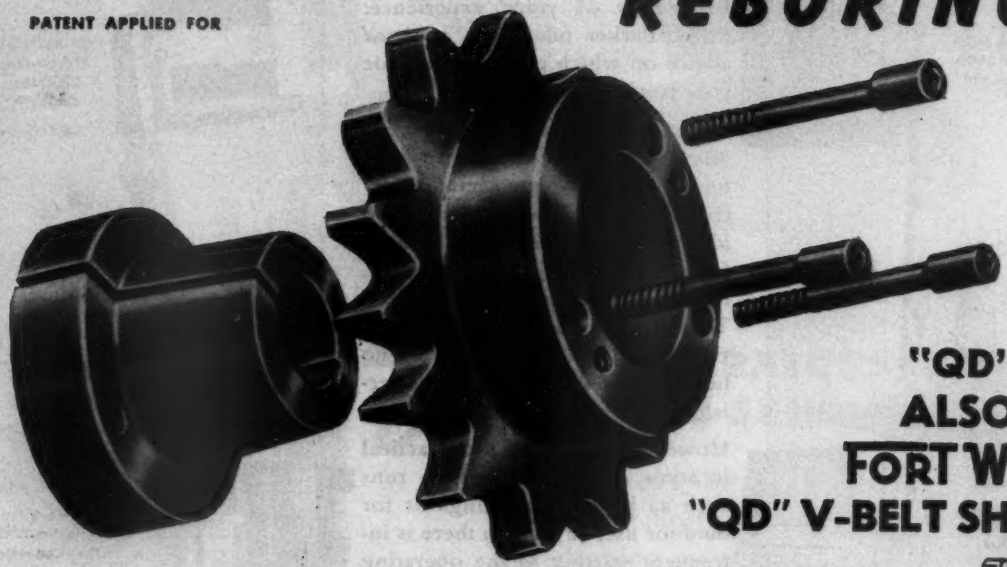

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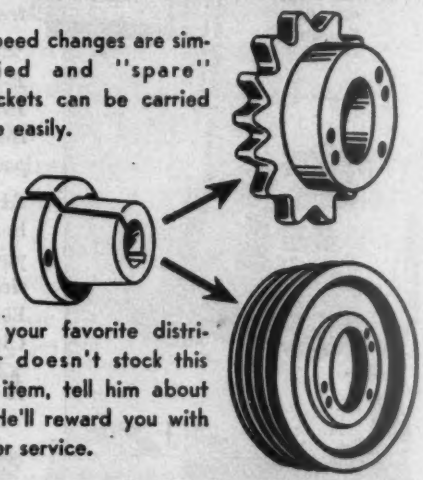

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used exclusively in

AUTOMATIC ELECTRIC TRUCKS

Dependable basic principles of HIGH PRESSURE HYDRAULICS found in the World's Fastest Jet Planes, are used *exclusively* in AUTOMATIC ELECTRIC TRUCKS. They represent the *peak of perfection* in advanced engineering design.

High pressure hydraulics efficiently and safely compress a tremendous amount of power into little space, and are used in the LIFTING and TILTING mechanism of Automatic Electric Trucks.

A 2,000 pound per square inch hydraulic system requires only one-half the area for working parts as compared with a low pressure 1,000 pound per square inch system. Consequently, all the units operating the lift and tilt mechanism on AUTOMATIC ELECTRIC TRUCKS are much smaller physically.

Thus, AUTOMATIC gives you a *smaller, more compact*, electric truck . . . a truck that lifts and tilts *smoothly* and *effortlessly* with easy, finger-tip control. Forks and uprights remain in any position indefinitely *without drifting* . . . and you get increased visibility with greater safety for operator.

Add to this, *smooth throttling* when "inching" loads, instantaneous response to controls, and you have the reasons industry has so enthusiastically accepted Automatic's EXCLUSIVE *high pressure hydraulic system!* Mail coupon.

AUTOMATIC PUTS MORE INTO ITS ELECTRIC TRUCKS SO YOU GET MORE OUT OF THEM

EXCLUSIVE TWIN LIFT RAMS

Permit Tiering in Low Head-Room Areas

Automatic's use of high pressure hydraulics, with *exclusive* twin lift ram arrangement, permits maximum free lift before increasing overall height of truck. As you can see from the illustration at the left, it allows tiering in box cars, highway trucks and low clearance storage areas. This is because the first lift ram elevates the forks and the second lift ram elevates the telescopic upright section. Thus the forks reach a maximum initial lift before telescopic section extends.

• • •

These are but a few of the many *extras*, precision-engineered and built into every inch of Automatic Electric Trucks. No wonder they are so widely preferred by industry to cut handling costs and workers' fatigue.

AUTOMATIC TRANSPORTATION CO.
DIV. OF THE YALE & TOWNE MFG. CO.
39 W. 87th Street, Dept. E-1
Chicago 20, Illinois

Please send me, without obligation, FREE Money-Saver Check Chart and FREE Booklet: "How To Make Your Material Handling Pay Dividends" . . . also more information on your Automatic ELECTRIC Trucks with HIGH PRESSURE HYDRAULICS.

*Company Name*_____

*By*_____ *Title*_____

*Street Address*_____

*City*_____ *Zone*_____ *State*_____

***another* EXCLUSIVE.. *another* FIRST.. *pioneered by* AUTOMATIC**

They brought Paris to the oil fields

A wonderful new fashion show was held in Paris . . .

One week later, the same show was staged—in Texas!

The place was Neiman-Marcus of Dallas, one of the most remarkable stores in the world. Though hundreds of miles from the "fashion capitals," they sell more exclusives from more top designers than any other store in the U. S.

After new Paris creations arrive in New York, it's only a matter of hours before they're displayed in the N-M salons!

Want to know their secret?

When Neiman-Marcus want a fashion scoop, they bring their high-fashions in at high altitudes. They use Air Express!

You don't have to be a Texan to want the *fastest* service in the world. Your business doesn't have to be fashions to profit from regular use of Air Express. Here are its unique advantages:

IT'S FASTEST — Air Express gives the fastest, most complete door-to-door pick up and delivery service in all cities and principal towns, *at no extra cost.*

IT'S MORE CONVENIENT—One call to Air Express Division of the Railway Express Agency arranges everything.

IT'S DEPENDABLE — Air Express provides one-carrier responsibility all the way and gets a *receipt upon delivery.*

IT'S PROFITABLE—Air Express expands profit-making opportunities in distribution and merchandising.

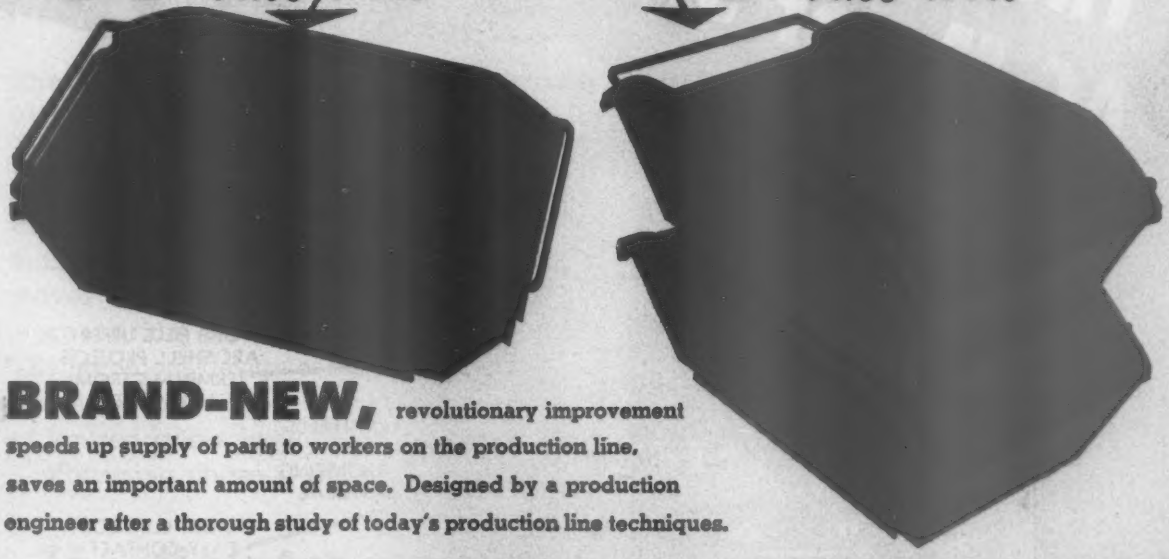
For more facts call Air Express Division of Railway Express Agency.

AIR EXPRESS

GETS THERE FIRST

NOW, *at last-an important improvement in* MATERIALS-HANDLING BOXES

NEST IT *like this* TIER IT *like this*



BRAND-NEW, revolutionary improvement speeds up supply of parts to workers on the production line, saves an important amount of space. Designed by a production engineer after a thorough study of today's production line techniques.

CHECK THESE 10 ADVANTAGES OF THE TWIN HOPPER NESTIER

1. Can be used in production between two operators working side by side. This saves space; saves time, too.
2. No racks are needed—NesTiers form their own racks.
3. Can be tiered, leaving parts visible and accessible from either end of the hopper.
4. In the tiered position, the NesTier can be loaded from one end as parts are withdrawn from the other.
5. Visual feature enables stockman quickly to tell when stock needs replenishing.
6. When tiered, remain steady, lock themselves firmly into each other.
7. Can be transported conveniently on mono-rail conveyor; will remain level even when conveyor is on incline.
8. When shipped, loaded, to other plants they save greatly on transportation space, particularly on the return trip when empties can be nested.
9. Space-saving efficiency — 55 units can be nested in a five-foot stack!
10. Easy to carry—even for women.

Card Holders are optional at extra cost.

HEAVY CONSTRUCTION -LONG LIFE ASSURED

The NesTier is made of 18-gauge steel, spot welded. Tiering bales are ¼-inch in diameter. It is 17" long, 9¼" wide, 5½" deep (inside). Weight, 7 lbs.

THE CHAS. WM. [illegible]

See NesTier at the Show - Booth 1021

DETROIT PUBLIC LIBRARY

It's All New! The CLARK "CY" AC Motor Starter

PRESSURE TYPE TERMINALS
LINE AND LOAD

ONE PIECE UPPER ARC SHELL PROTECTS TERMINALS FROM HOT GASES

ARC SHIELDS INORGANIC NON CARBONIZING MATERIAL

FINGER CLIPS FOR EASY CONTACT INSPECTION

MAGNETIC ARC INTERRUPTERS WITH ARC CHAMBERS

another CLARK FIRST

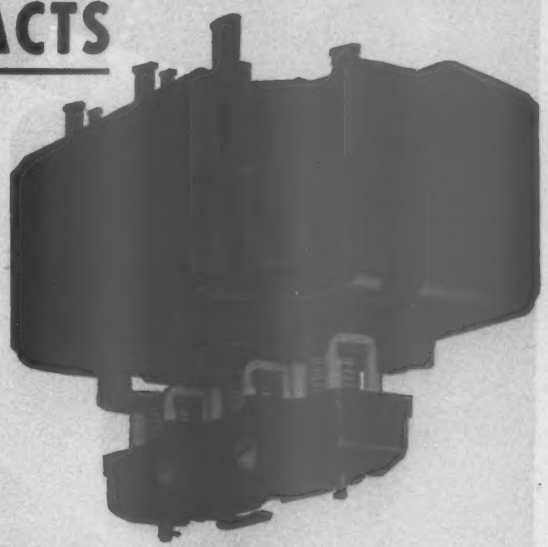
Here, for the first time is a rugge
AC magnetic starter that provide
the extra protection and dependab
operation of "Mill-Type" heavy-du
construction and design at *no pr*
mium above ordinary starter price

- No fil
- No to
- Easy
- Statio

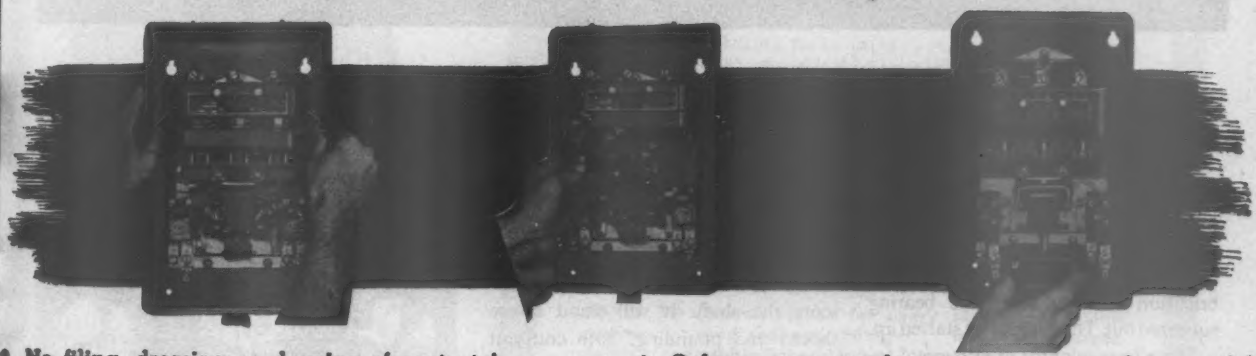
let a CLARK application engineer show you what this CLUB RIBBON PRODUCT means to you in increased production and lower maintenance.

and TWIN-BREAK CONTACTS

The "CY" starter employs an entirely new principle of arc interruption. The arc is extinguished by the effect of the blow-out coil, *concentric with the contact.* The magnetic field quenches the arc either by lengthening or confining it. In its *forced rotation* it moves continually from a hot to a cold spot —preventing burning or pitting of contacts. The ingenious design of the arc chamber prevents carbonization and the accumulation of ionized gases between wiring terminals —minimizing phase-to-phase failures.*



The Maintenance Man's Dream!



- **No filing, dressing or cleaning of contacts!**
- **No tools necessary to inspect contacts!**
- **Easy to change moving contacts!**
- **Stationary contacts changed quickly with screw driver!**
- **Only two screws and one pin to remove to change coils!**
- **Only four screws to remove to take out stationary magnet frame!**
- **Power circuit contacts available with springs in complete packaged service kits for ease in stocking!**

**Magnetic blow-out coils are used on all size 2 and 3 "CY" starters. Sizes 0 and 1 use the same general Mill-Type construction as the larger sizes.*

THE CLARK CONTROLLER CO.

this metal heals its hurts
before they happen

when regular lubrication fails, "Tiger" Bronze lubricates itself to prevent damage

One of our Sales Engineers recently reported . . . "The inexperienced maintenance man bolted down the bearing housing so tightly that the film of lubrication between shaft and bearing squeezed out. The equipment started up.

"Five long minutes of dry, metal-to-metal operation passed before the smoking bearing signalled shut-down. Examination showed the expensive steel shaft was unharmed because the lead content of the 'Tiger' Bronze bearing had sweated out and plated the running surface, cushioning the shaft and preventing seizure."

"Tiger" Bronze is hard enough to carry heavy bearing loads without distortion. It is soft enough to embed foreign particles that would otherwise score the shaft. It will stand severe shocks and pounding, both constant and intermittent. "Tiger" Bronze is easy to machine at speeds as high as 3000 f.p.m., and requires no lubricants or coolants when machining.

"Tiger" Bronze is available in cored and solid bars, as cast or machined, in popular sizes for *direct* shipment at substantial savings. Write Dept. C.

AMERICAN Brake Shoe COMPANY
230 PARK AVE., NEW YORK 17, N. Y.

10 Divisions of American Brake Shoe Co. produce wear-resisting parts in 58 American and Canadian plants.

AMERICAN BRAKEBLOK DIVISION • AMERICAN FORGE DIVISION • AMERICAN MANGANESE STEEL DIVISION
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KELLOGG DIVISION • NATIONAL BEARING DIVISION • RAMAPO AJAX DIVISION • SOUTHERN WHEEL DIVISION

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Just Out!

NEW 36-PAGE EDITION OF

PIPING POINTERS

...a bigger, more helpful handbook for training maintenance workers

You asked for ¼ million copies of the last edition of Piping Pointers. You found it a big help in training beginners and refreshing veterans in your piping crews. The bigger and better edition is just out —changed in appearance but not in purpose. Crane again offers this booklet—to help keep your piping systems at peak efficiency.

Piping Pointers talks facts . . . not theory. Thoroughly covers the fundamentals of good, sound, everyday piping practices . . . in easy-to-grasp, nontechnical language. Its many "how-to-do-it" features are illustrated for easy understanding.

Mistakes in piping installation and maintenance cost more today. Piping Pointers can help your men avoid them. Just ask your Crane Representative for a copy.

PARTIAL INDEX TO PIPING POINTERS

HOW TO choose valves for every service . . . install valves . . . read reducing fittings . . . make up screwed joints . . . assemble flanged joints . . . make up solder joints . . . install pressure regulators . . . use vent and drain valves . . . avoid steam trap trouble . . . save on pipe joints and materials . . . handle piping tools.

plus THE CRANE VALVE SELECTION GUIDE

which saves time and effort in selecting valves for common piping services.

PIPING POINTERS 16-mm SOUND FILM
Free Usage for Group Training

A 30-minute motion picture that dramatizes the fundamental information in the Piping Pointers Manual. Ideal for classroom or plant training groups. Available on request through your local Crane Branch.

CRANE

CRANE CO., *General Offices:*
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

HOW BOSTON Gear HIDDEN QUALITY SAVES YOU HIDDEN EXPENSE

BOSTON REDUCTOR — **BOSTON RATIOMOTOR**

To the naked eye, one power transmission unit may look just like another — so why not buy the one that costs a bit less? The answer, as many have learned from bitter experience, is that the difference in operating and replacement cost (the unforeseen or "hidden" expense) far exceeds the difference in purchase price.

Take the Case of the Production Welding Machine

A large unit was designed around a low priced speed reducer that gave out in a few weeks and had to be replaced by a BOSTON Reductor. Here is the cost picture:

Net difference in first cost	+ $ 10.00
Cost of repairing machine and replacing gear unit (3 man-8 hrs. @ $3.00 per hr.)	— 30.00
Loss of production (6 hrs., 12 parts per hr. @ $24.00 per part)	— 1,440.00
NET LOSS	$1,459.50

Take the Case of the Baking Oven

A cut price motorized speed reducer failed and was replaced by a BOSTON Ratiomotor.

Net difference in cost	+ $ 10.40
Cost of overhauling oven and installing new unit (3 men, 4 hrs. @ $2.60 per hr.)	— 24.00
An entire batch of pastry worth $30.00 was lost due to drive breakdown. This, plus production loss (4 hrs., 15 batches per hour @ $30.00 per batch) made a total loss of	— 960.00
NET LOSS	$993.60

Write for Catalog No. 55 It contains a wealth of useful data and selection charts

The *hidden quality* in BOSTON Reductors and Ratiomotors is very real, even if you don't detect it at first glance. It is the result of BOSTON *Gear's* strict materials control, master craftsmanship and rigid inspection system. This *hidden quality* plus the unequalled convenience and service obtainable from Authorized Boston Gear Distributors (*see adjacent list*) makes it true and lasting economy to:

Specify Standardized Boston Reductors and Ratiomotors
Design Them Into Your Equipment
Get Them From Nearby Stock

BOSTON GEAR WORKS
42 HAYWARD ST., QUINCY 71, MASS.

BOSTON Gear STOCKS ARE Here at factory prices

Save time and money—assure yourself of uniform quality and parts interchangeability by standardizing on Boston Gear quality products—stocked at these Authorized Boston Gear Distributors—one near you!

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Bearing Distributors, Inc.
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Super-Speed Sup. Co.
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J. M. Tull Metal & Sup. Co.
285 Marietta St.
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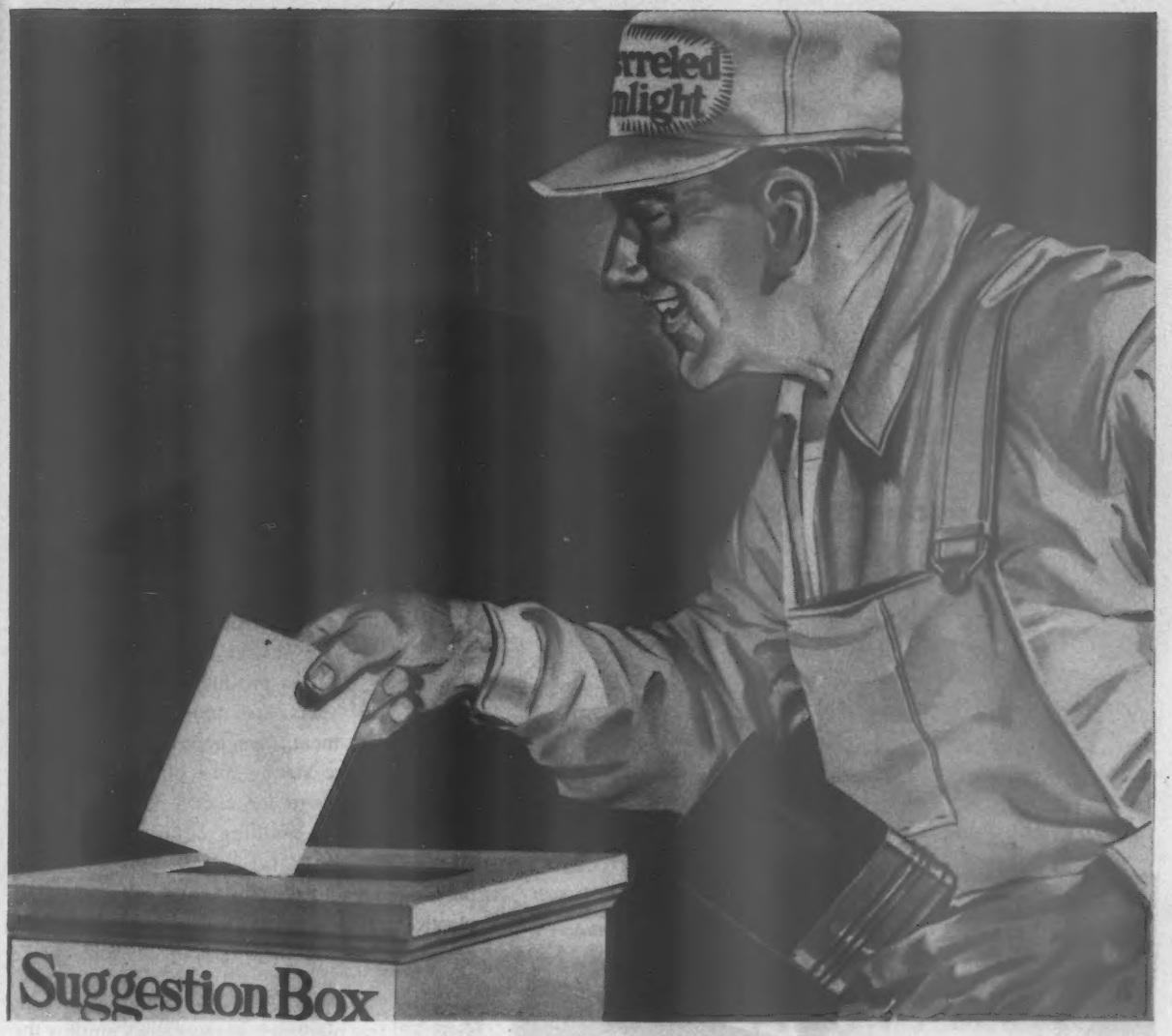
171 Fremont St.

BOSTON Gear STOCKS ARE Near



An Idea that Really Pays Off

It couldn't come from a better source. After all, a painter . . . his time and labor . . . represents eighty per cent of the total cost of a paint job. And when a painter suggests that you forget about price per gallon and start buying paint on a *performance* basis, he's putting money in your pockets.

This simple test will prove it. Take a gallon of Barreled Sunlight and a gallon of any other paint you want to name and thin each according to directions on the cans. First thing you'll notice is that Barreled Sunlight gives you more paint *ready for the brush* . . . which means, of course, you can save on gallonage. But of *far greater importance,* let your painter test each *on the wall.* See how much better Barreled Sunlight looks . . . how much better it hides . . . how much more "yardage" you get in an hour of painting time.

No wonder so many leading plants who have made this test have standardized on Barreled Sunlight — some for as long as forty to fifty years.

Talk it over with our representative. Write, and he'll gladly call.

BARRELED SUNLIGHT PAINT CO.
2-E Dudley St., Providence, R. I.

Barreled Sunlight *Paints*

In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job

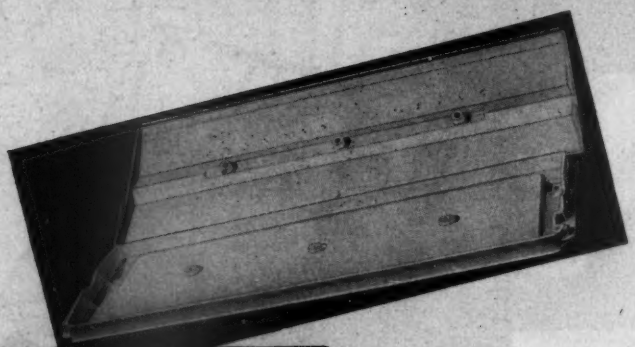
IT ALWAYS COSTS MORE NOT TO PAINT!

For over half a century those who know the best in paints . . . for all types of buildings . . . have strongly insisted on famous Barreled Sunlight

One of a series of messages to plant managers and purchasing executives showing how General Electric's *specialized* plastics molding service offers important advantages to selected industries and in defense work.

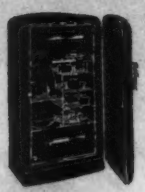
Specialized MOLDING SERVICE

PRODUCES LIGHTER, MORE ATTRACTIVE REFRIGERATOR PARTS!



General Electric molds parts like these for several large refrigerator manufacturers.

And remember—G-E sealing caps and sleeves provide low-cost protection for small refrigerator parts.



Here's an example of how General Electric's plastics molding service turns out improved, mass-produced, low-cost products. G-E molded snack boxes, freezer doors, meat trays, and other refrigerator accessories are strong and durable, easy to clean, appealing to the eye.

New, modern molding equipment enables General Electric to turn out large-size plastics parts quickly and efficiently. In many cases, G-E plastics engineering has made possible important cost savings on molded parts of this sort.

Depend on G.E.

G-E molding plants are *modern;* they employ the newest machines and techniques. Large users of plastics parts consider G.E.'s large-capacity molding facilities as an efficient adjunct to their own assembly lines.

General Electric's specialized *molding service is geared to industries like these: television, radio, washing machine, refrigerator, air conditioning, automotive and electrical apparatus. For information, write to Section C-3, Chemical Department, General Electric Company, Pittsfield, Mass.*

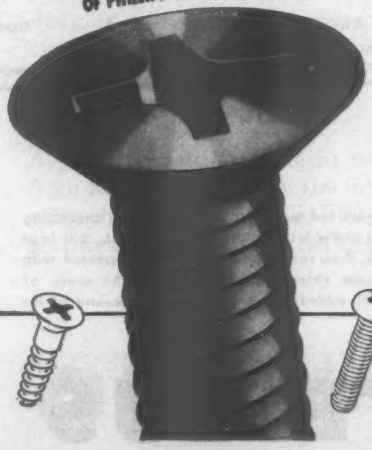
MOLDED PLASTICS FOR DEFENSE

Defense contractors can depend on General Electric for developing and producing a great variety of molded plastics parts. The broad scope of this service is indicated by G-E compression equipment ranging in capacities from 3 to 36 inches; injection equipment that can handle shots of from 1½ to 208 ounces.

You can put your confidence in

GENERAL ELECTRIC

4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS



On all Defense Assemblies... get Pistol-like Speed and Accuracy with AMERICAN PHILLIPS SCREWS

Load . . . aim . . . pull the trigger! Power-drive American Phillips Screws the "rapid-fire way" . . . straight . . . tight . . . *right.* Get fastenings that have top torque values . . . top shear and *structural* strength. And get them 50% faster than you can get them by any other screw-driving method!

That's the American way to save time, effort, rejects . . . and control assembly costs. And if you have vital defense work, *now's* the time to do it.

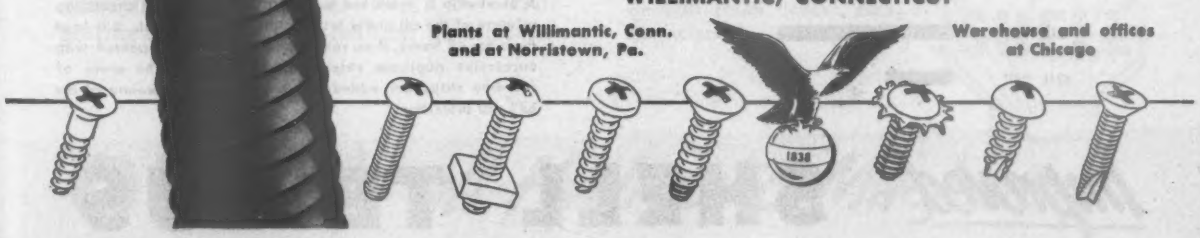
AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

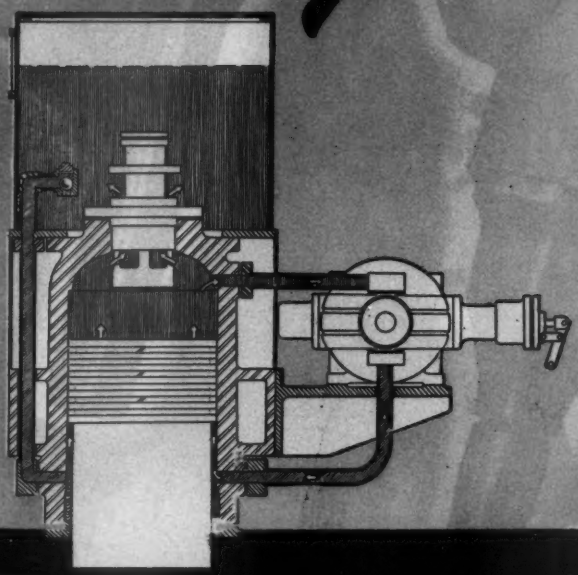
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.

Warehouse and offices at Chicago

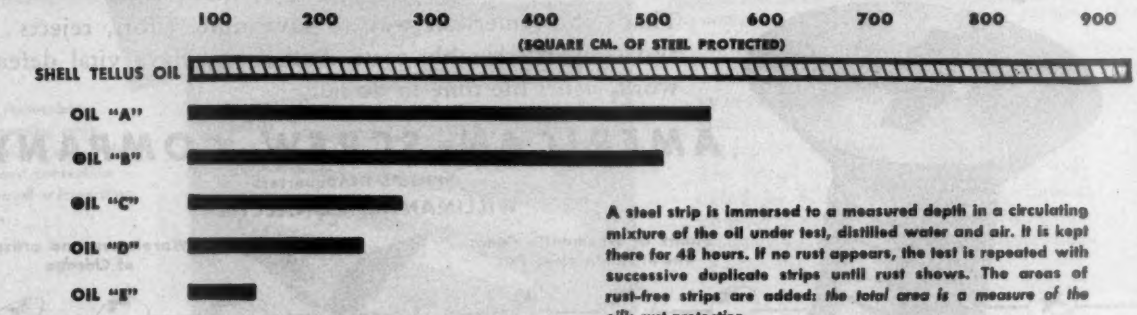


Today's surest ...for



Improved SHELL TELLUS OIL

LOOK AT THIS RUST-INHIBITION TEST



A steel strip is immersed to a measured depth in a circulating mixture of the oil under test, distilled water and air. It is kept there for 48 hours. If no rust appears, the test is repeated with successive duplicate strips until rust shows. The areas of rust-free strips are added: *the total area is a measure of the oil's rust protection.*

Improved SHELL TELLUS

protection— Hydraulic Equipment

The one fluid that:

1. Prevents Rusting

With a new combination of inhibitors, the result of eight years' continuous research and operating tests. The chart on opposite page graphically illustrates the wide margin of superiority with which this new oil protects against rust.

2. Excels in Oxidation Stability

Improved Shell Tellus Oils have even greater resistance to the formation of harmful oxidation products than previously. The specially developed oxidation inhibitor in Improved Shell Tellus Oils enables these oils to far exceed accepted service life. Service records for dozens of hydraulic machines of many types prove outstanding stability with respect to oxidation and sludge formation. You can be confident that sludging will not be a problem in any of the vital parts of your equipment.

3. Reduces Foaming

An effective anti-foam agent provides freedom from foaming caused by the inclusion of air or gases in the hydraulic oil. Thus, a smooth operating system can be realized at all times. Minor air or gas leaks can be tolerated for considerable periods, thus avoiding unscheduled shutdown.

4. Prevents Wear

Because of its outstanding ability to penetrate between closely fitting surfaces, and to maintain a tenacious film at all times, Improved Shell Tellus Oil keeps wear at a minimum. The high film strength persists through variations in pressures and temperatures encountered in hydraulic systems.

5. Has Highest Demulsibility

Improved Shell Tellus Oil provides freedom from emulsions. Experience in service proves a rapid separation from water, even with unusually "wet" systems.

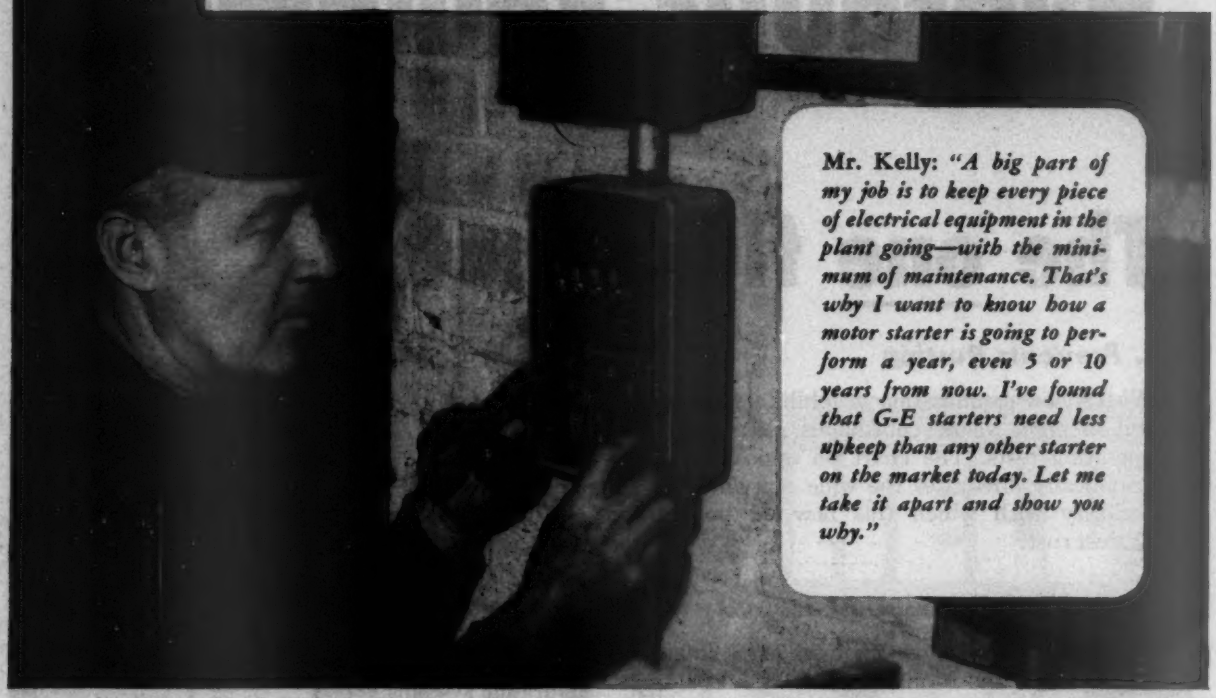
You are invited to write for full information on Improved Shell Tellus Oil. Samples are available for your tests. Write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y. or 100 Bush Street, San Francisco 6, California.

SHELL

OIL *for all Hydraulic Machinery*

MOTOR STARTERS ...need less

MARTIN KELLY, PLANT-



Mr. Kelly: *"A big part of my job is to keep every piece of electrical equipment in the plant going—with the minimum of maintenance. That's why I want to know how a motor starter is going to perform a year, even 5 or 10 years from now. I've found that G-E starters need less upkeep than any other starter on the market today. Let me take it apart and show you why."*

Martin Kelly, Plant Electrician for John R. Evans & Co., changes an overload relay on G-E combination starter quickly and easily.

Mr. Kelly: *"First, the coil. It sure takes rough handling!"*

1 Right you are, Mr. Kelly. We call it the "Strongbox Magnet Coil." That block of plastic keeps the windings permanently protected against dirt, moisture, and oil. And if your screwdriver slips, it can't damage the windings.

Mr. Kelly: *"I've seen no sign at all that these contacts are burning or pitting."*

2 That's because they have fine silver tips that outlast by far the ordinary type contact. Even where it's a "start-stop" job with dozens of operations each minute, they'll stand the gaff.

GENERAL ELECTRIC

730-20

upkeep for 4 big reasons!

ELECTRICIAN, SHOWS WHY—WITH THE "SCREWDRIVER TEST"

Mr. Kelly: *"There doesn't seem to be any wear on the moving parts."*

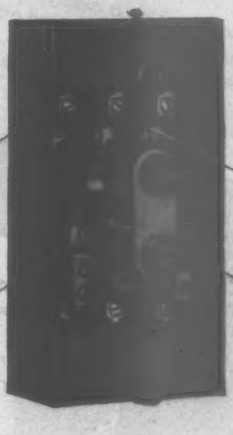
3 That's right. The moving structure is rugged and basically simple. There's no metal-to-metal friction between magnet and coil; thus, little or no wear. And the "molded-in" lubricant in the coil keeps the magnet operating smoothly and quietly for life.

Mr. Kelly: *"Overload protection means a lot; I certainly don't want any burned-out motors these days."*

4 Those overload relays will give your motors all the protection they'll ever need. They are reliable and never need any attention. Heaters are in front and can easily be changed without disturbing any wiring.

MANUAL STARTERS, TOO . . .

For infrequent starting of 7½ hp or smaller motors, you can't beat a G-E manual starter for economy and dependable operation. . . Built to the same rugged specifications as the magnetic starter, it includes many of the same features for long life and easy upkeep.


Front-connected clamp-type terminals, and plenty of wiring space.
Fine silver contacts long outlast ordinary contacts
Sturdy, vibration-resistant, snap-action switch mechanism
Bimetallic overload protection with heaters readily accessible

A complete line of control accessories . . .

Push-button stations, limit switches, photo electric relays

. . . and many others can make operations more automatic, more convenient.

BUY ONE AND COMPARE! Disassemble a G-E motor starter, magnetic or manual, and inspect it. See for yourself why G-E starters last longer, cost less to install, and are easier to maintain than any starters you can buy. Your G-E representative or authorized distributor can supply many models of G-E starters in NEMA sizes 0, 1, 2, and 3 for motors up to 50 hp; anticipate your requirements and place your order early. For more information on magnetic starters, write for Bulletin GEA-5153; manual starters, Bulletin GEA-1522. *Section 730-20, Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

Built-In Balance Improves Toolroom Grinding When You Use...
Uniform structure assures identical cutting action throughout each wheel and from wheel to wheel... prevents vibration... allows closer tolerances, smoother finishes.
Precision, lightweight bushing maintains the new inherent balance... is more firmly anchored in the wheel... gives precision arbor fit.
Made of various Norton abrasives for fast, cool cutting of expensive high-speed steel and cast alloy tools without drawing their temper. Reduce tool spoilage.
YOUR NORTON DISTRIBUTOR NOW HAS THEM in sizes and shapes up to 12" diameter for any toolroom grinding job. ASK FOR THEM.
NORTON
ALUNDUM

NORTON NEW-PROCESS GRINDING WHEELS

Truly uniform within each wheel and from wheel to wheel

NO OTHER WHEELS GIVE YOU ALL 3

1. YOU GET CLOSER TOLERANCES because the built-in balance of Norton *New-Process* Wheels reduces vibration . . . eliminates chatter marks . . . lasts for the life of each wheel.

2. YOU GET MORE UNIFORM GRINDING ACTION because the more uniform structure of Norton *New-Process* Wheels causes more even wheel wear. You also have perfect confidence that all identically marked wheels *will perform identically.*

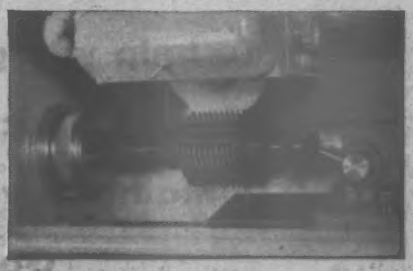
3. YOU REDUCE TOOL SPOILAGE because Norton *New-Process* Wheels, made with the *right* selection of fast, smooth-cutting Norton abrasives, allow heavier cuts in expensive, heat-sensitive, high-speed steel and cast alloy tools . . . without drawing their temper.

COMPARE Norton *New-Process* grinding wheels with any others in your toolroom . . . and watch production rise and costs drop. Your nearby Norton distributor or representative will help you select from the wide range of Norton tool and cutter wheels ones that will improve your toolroom grinding.

NORTON COMPANY, WORCESTER 6, MASS.
Warehouses in 5 cities. Distributors in all principal cities.

NORTON
ABRASIVES
Making better products to make other products better

ALL TEETH ARE THE SAME HEIGHT when you sharpen milling cutters with long-wearing free-cutting Norton *New-Process* Wheels . . . they hold size all the way around the cutter.



CORNERS ARE HELD, yet free cutting action maintained, when you sharpen gear cutting and splining hobs with Norton *New-Process* Alundum* Wheels.

FLAT, CHATTER-FREE SURFACES on tools and dies directly result from the built-in, work-hugging balance and dimensional accuracy of Norton *New-Process* Wheels.

FREE 160-PAGE HANDBOOK FOR TOOLROOM OPERATORS

Here's the most comprehensive guide to top-production, bottom-cost toolroom grinding ever published. Every operator should have a copy of this Handbook on Toolroom Grinding. Write for your free copy of FORM 835-B3

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

Here's Help

You demand more and more from your batteries as industry strains its facilities for defense. To help you get more out of these essential tools of production—to choose, use, handle and maintain your batteries without waste— Gould announces the

GOULD

You Need NOW!

Battery performance can be improved as much as 50%* if these eight points are put into practice:

1. **Buy Your Batteries to Fit the Job.** Purchase of oversized or undersized batteries wastes money, materials and manpower.
2. **Install Your Batteries Correctly.** Connect them properly, ventilate adequately and handle according to printed instructions.
3. **Use Your Batteries Within Designed Capacities.** Overdischarge cuts down battery performance.
4. **Charge Your Batteries Properly.** Use recommended rates of initial, finish and float charges.
5. **Maintain Your Batteries Systematically.** Organize a preventive maintenance program.
6. **Inspect Batteries Periodically.** Tighten loose connections and replace worn cables.
7. **Test Your Batteries Regularly.** Keep a record of cell readings—know the condition of your batteries at all times.
8. **Replace When Necessary.** When you know the condition of your batteries, you can place your orders far enough ahead to insure continuous service.

GOULD'S PLUS-PERFORMANCE PLAN is designed to help you conserve and extend your essential battery power. It is a complete, integrated system of manuals, articles, specifications, bulletins, record cards and charts which give you information on every one of these eight points—explaining and illustrating how to choose, use, install, charge, maintain, inspect and test.

**From tests in the Gould Research Laboratory and performance tests in the field.*

LET THIS PLAN GO TO WORK FOR YOU...WRITE US TODAY!

Any or all of the material available under the Gould PLUS-PERFORMANCE PLAN is FREE to battery users without obligation. A request on your letterhead stating the particular problem or problems in which you are interested, will bring the appropriate literature—and booklet explaining the complete plan—by return mail. Write us, attention Field Engineering Department.

GOULD

STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

YOU CAN BE SURE.. IF IT'S
Westinghouse

TYPE AVRB
15 to 100 kva

TYPE AJRB
3 to 10 kva

TRIPLE

Protection against Overloads

Trouble caused by short circuits or by transformer overloads is stopped before it starts when you use Westinghouse Dry-Type Transformers with built-in circuit breakers. The breakers are connected in the high-voltage circuit, and are actuated by either (1) the coil-load current, (2) the temperature of the air within the transformer or (3) by both. This triple action provides *complete protection . . . sure* safety for circuits if trouble occurs. Furthermore, the co-ordinated time lag of the breaker permits carrying nondamaging, short-time overloads without service interruption.

You can get quick, economical correction of overloaded circuits with Westinghouse Dry-Type Transformers that have breaker performance like this . . . plus these additional features:

LOW INSTALLATION COST: Connect direct to wiring or raceways. Because you can install dry-type transformers close to the load, long runs of low-voltage lines can be eliminated.

EASY MOUNTING: Mount them wherever power is needed—on the floor, walls, columns, platforms, or overhead.

LOW MAINTENANCE COST: Dry-type construction is recognized as the "minimum maintenance" transformer design.

Save on power costs—run *your* distribution voltage close to the load with Westinghouse Dry-Type Transformers. Available in hv ratings of 600, 480 and 240. 100 kva and below, single phase. Ask your Westinghouse representative for Booklet B-4439, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70555

Westinghouse

DRY-TYPE TRANSFORMERS

Caster Quiz

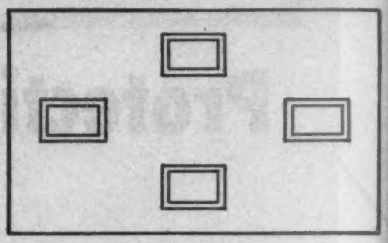
A "quick facts" feature with helpful suggestions on the use of casters . . . to reduce materials-handling costs, the "Reducible 30%"*

Q. How can large steel plates be supported for easy shearing and forming?

A. Grout or socket pipe standards into the floor at 18 in. intervals. On top of them, mount upside down, easy-swiveling Bassick Casters, at the desired height. By this device Westinghouse enables operators to move plates freely in any direction.

Q. What factors should be considered in picking the right-sized caster?

A. Load capacity and floor conditions. Consider maximum load to be carried, possibility of overloading. Allow a bit more than the load you estimate. Consider rough floors, sharp door sills, obstructions, elevators, etc. *Select a wheel large enough to ride over obstacles easily.* The larger the wheel, the easier the equipment will roll.



Q. When should only rigid casters be used on trucks?

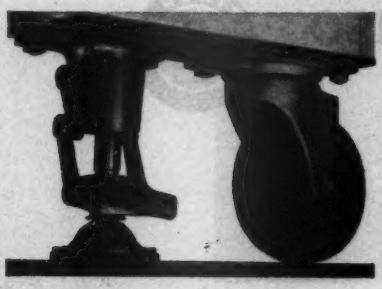
A. It's economical to use rigid casters alone, on balanced center, for light loads, travelling long, straight distances.

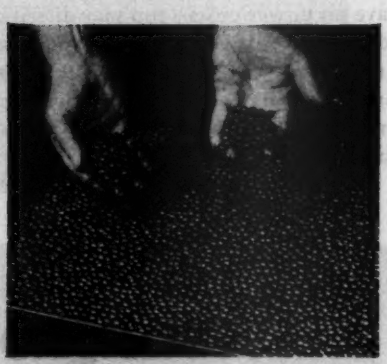
$25 for your materials-handling solution!

If accepted for use in this advertising, we'll pay $25.00 for any case history of how you've used Bassick Casters to deal successfully with a particular difficulty. Address the world's largest manufacturer of casters and floor protection equipment . . . THE BASSICK COMPANY, Bridgeport 2, Conn. Division of Stewart-Warner Corp. *In Canada:* Bassick Division, Stewart-Warner-Alemite Corp., Ltd., Belleville, Ont.

Q. Can trucks and portable equipment be easily held stationary?

A. Yes, with Bassick Position Locks, mounted as shown for quick accessibility. Easily applied and released by foot. Flexible mounting of 12 sq. in. braking surface assures good floor contact and firm grip both on even and uneven floors.





Q. Guess how many ball bearings were used in making Bassick Casters in 1950?

A. Over 400,000,000 . . . a record high for the world's largest manufacturer of casters and wheels, in the world's widest range of sizes and types.

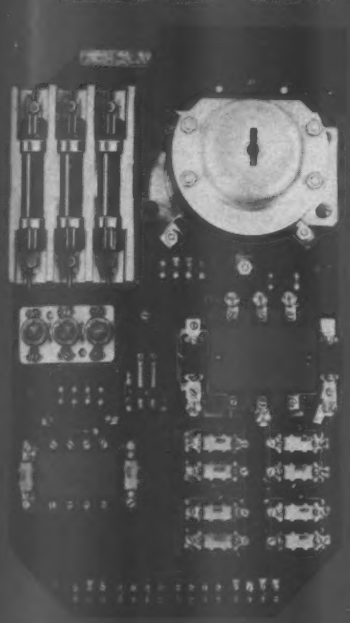
* *According to cost analysts, materials-handling (about 30% of total cost) affords about the only real opportunities for cost reduction today.*

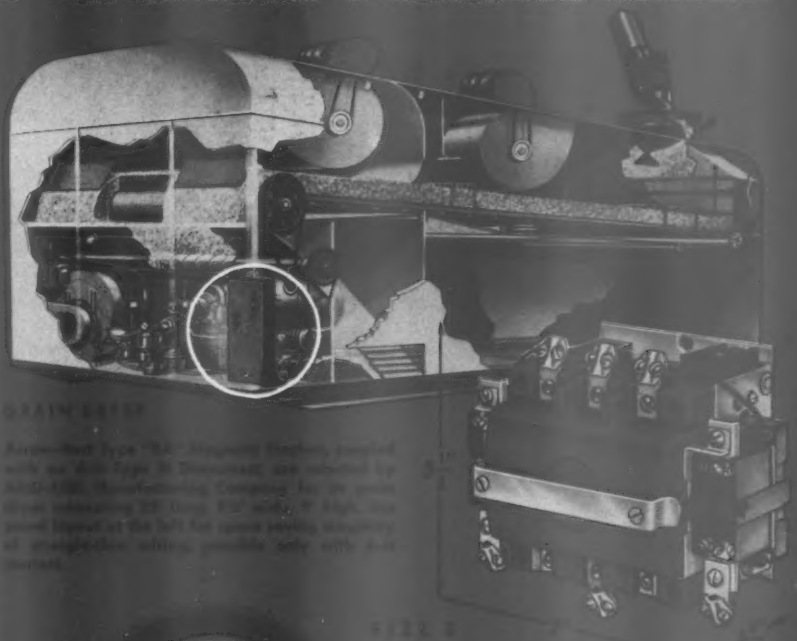
SEE OUR CATALOG IN SWEET'S

Bassick

MAKING MORE KINDS OF CASTERS ... MAKING CASTERS DO MORE

BRING OUT **BUILT-IN PERFORMANCE** OF MOTORS AND MACHINERY

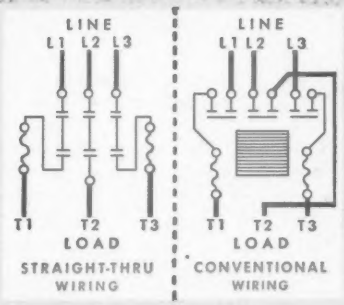




TYPE "RA" ARROW AH HART MAGNETIC STARTERS

JUST 1/2 THE SPACE

PLUS STRAIGHT-THRU FRONT WIRING



Yes, to obtain maximum built-in performance from quality machines, use Arrow-Hart advanced design Type "RA" Magnetic Starters, smallest ever manufactured, first to give you ***straight-thru front wiring.*** This means faster, neater installations at savings up to 30%; safer, direct routing with greater separation of line and load; immediate identification of circuits; elimination of crossing, looping, U-bending; no need for a load terminal on the line side. This simplicity with versatility is *not* possible with solenoid or other type starters. Compare the connection diagrams to the right and on the reverse side for conclusive proof of the straight-thru wiring benefits of Arrow-Hart Magnetic Starters — the most logical controls to specify, buy, and use. Available in sizes 0, 1, 2, 3 and 4.

COMPARE!

Write for folder complete with design and operating features, dimensions, ratings and other pertinent data.

BUY WITH CONFIDENCE PROFIT BY PERFORMANCE

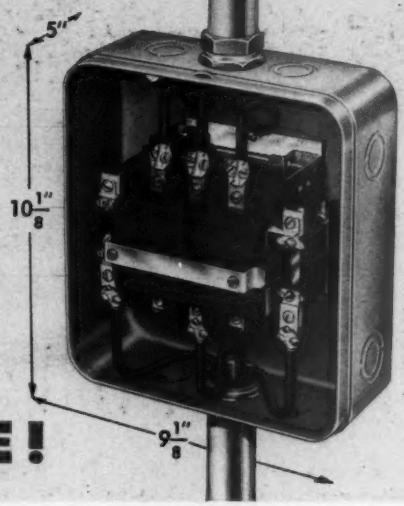
THE ARROW HART & HEGEMAN ELECTRIC COMPANY, HARTFORD, CONN., U. S. A.

ARROW AH HART

MORE BIG FEATURES IN JUST 1/2 THE SPACE!

ARROW AH HART

TYPE "RA" MAGNETIC STARTERS



Arrow-Hart Magnetic Starters occupy just 1/2 the space of conventional starters. This means an overall reduction in the size of the control panel and a substantial reduction of material costs. The exclusive "RA" mechanism sets a new standard for functional simplicity in design — a new and superb performance acclaimed by more and more original equipment designers and manufacturers, electricians and maintenance men.

Other features include high arc resistant and suppression chambers for each set of contacts; big, heavy duty copper contacts with special silver alloy tips; guided parallel closure of contacts; improved magnet and coil; precision calibrated relays. All parts are easy to reach, wire and service for outstanding performance and economy.

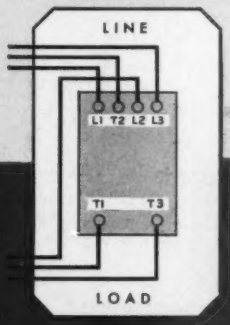
SIZE 2 ILLUSTRATED

MECHANISM DIMENSIONS
DEPTH — 4⅝" HEIGHT — 5½"
WIDTH INCL. RELAYS—7"

COMPARE!

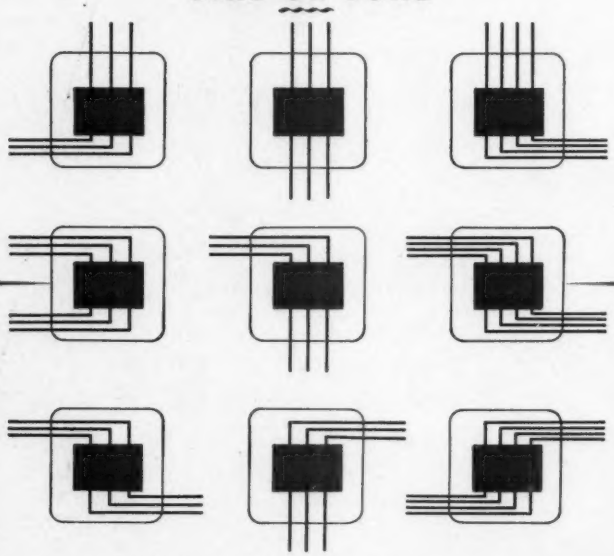
CONVENTIONAL WIRING

3 PHASE STARTER



ARROW-HART STRAIGHT-THRU FRONT WIRING

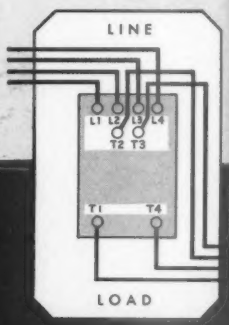
LINE OR LOAD



Arrow-Hart straight-thru wiring makes the most of installation and maintenance opportunities for space, time and work savings. Faster and neater layouts, direct routing without crossovers, immediate circuit identification are all plus performance features of the A-H advanced design.

CONVENTIONAL WIRING

2 PHASE 4 WIRE



ARROW·HART

THE ARROW-HART & HEGEMAN ELECTRIC COMPANY
103 HAWTHORN STREET
HARTFORD 6, CONNECTICUT, U.S.A.

Branches in: BOSTON, CHICAGO, CLEVELAND, CINCINNATI, DALLAS, DENVER, DETROIT, LOS ANGELES, NEW YORK, PHILADELPHIA, SAN FRANCISCO, SYRACUSE. In Canada: ARROW-HART & HEGEMAN (CANADA) LTD., MT. ROYAL, TORONTO

Now, more than ever before...

YOU NEED THE PROTECTION OF

WIREBOUND BOXES and CRATES

Losses due to container failure have no place in an industrial economy facing material allocations and shortages. That's why you should investigate *Wirebounds* —which combine the strength of steel with thinner wood to bring you *better product protection at lower cost.* Three hundred graduate engineers of the Wirebound Institute have been technically trained to design tailor-made *Wirebounds* which assure damage-free product delivery. The value of this container engineering is clearly demonstrated in the following case histories. We will be glad to show you how these benefits apply to *your* product. Use the coupon below.

YOU CAN CUT DAMAGE CLAIMS LIKE THIS:

Upside-down loading of circuit reclosers caused breakage, leakage, sometimes irreparable damage in handling and transit. Since switching to Wirebounds, company reports damage claims have become negligible.

Using Wirebounds designed to "float" 400 lb. precision engines, this manufacturer chalked up a record of 3000 shipments in fifteen months without a single instance of damage in transit due to container failure.

Flexible power cable reeled on shipping weighs from 620 to 770 pounds, cut crating time 30%. Company stacks and handles units four high. Shipping damage due to container failure has been completely eliminated.

choose your course of action...

Wirebound
BOXES & CRATES

☐ Send me general information . . . complete descriptive book titled "What to Expect from Wirebounds."

☐ Send me specific information . . . tear sheets of case histories of packing products similar to mine.

☐ Give me direct action send an Institute trained sales engineer to show the advantages of Wirebound packing for my own product.

NAME _____ POSITION _____

FIRM _____

STREET AND NUMBER _____

CITY _____ ZONE _____ STATE _____

OUR PRODUCT IS _____ IT WEIGHS _____

Users names on request

mail now to WIREBOUND BOX MANUFACTURERS ASSOC.
Room 1155—327 South LaSalle Street, Chicago 4, Illinois

MILFORD QUALITY CONTROL

MILFORD'S REPUTATION

for manufacturing hack saw blades of unsurpassed quality is jealously guarded by a vigilant program of quality control. Knowing that excellence in finished MILFORDS depends on excellence of raw materials, testing at MILFORD starts with the raw saw stock. Inspection and testing follow each successive step in production — end only after finished MILFORDS have passed rigid performance tests. MILFORD inspectors — all specialists — working with the finest in test, inspection and research equipment, devote their hours to protecting MILFORD'S reputation for the . . .

"STANDARD OF QUALITY . . . . THE WORLD OVER."

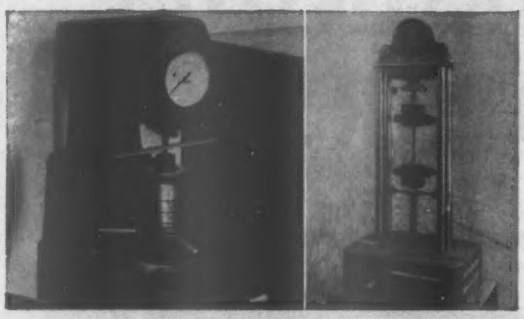
THE MILFORD ALL-HARD REZISTOR power hack saw blade, long the standard of comparison, is better than ever before. Tests conducted by MILFORD, and by impartial metal cutters, show this superior REZISTOR lasts 30% longer, and delivers 20% more straight cuts 5% *faster* than any previous REZISTOR. Made of M-2 high speed steel, widely used in making fine automotive cutting tools, All-Hard REZISTORS are specially heat treated for long wear and high heat resistance. This fine cutting tool is a working example of MILFORD'S tireless efforts to guarantee you peak performance from every REZISTOR.

THE HENRY G. THOMPSON & SON CO., NEW HAVEN, CONNECTICUT

SAW BLADE MAKERS FOR 75 YEARS

1876-1951

GUARANTEES PEAK PERFORMANCE

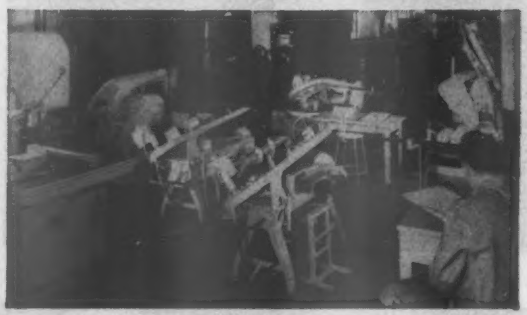


RAW MATERIAL TESTING . . .

Testing at MILFORD starts with the raw saw stock. Samples from every shipment of raw saw steel received at MILFORD go to the metallurgical laboratory. As shown left, these samples are subjected to rigid tests for tensile strength and Rockwell hardness. Only that stock which truly meets MILFORD'S high standards is approved for production purposes.

METALLURGICAL TESTING . . .

Teeth come under the continuous scrutiny of MILFORD Metallurgists. Each day sample teeth from blades undergoing heat-hardening are examined at 500 diameters for micro-structure. If tooth structure deviates from established standards, furnace adjustments are made, further sampling required. Only when MILFORD hardness standards are reached, is production resumed. Periodic sampling throughout the day assures uniform high quality — uniform top performance.



PHYSICAL TESTING . . .

Finished blades — fresh from the production line — are subjected to severe break-down tests by MILFORD test engineers. Only on the satisfactory completion of this all important phase of MILFORD testing are the blades approved for you. This is just another example of MILFORD'S consistent effort to guarantee you PEAK PERFORMANCE in every MILFORD.

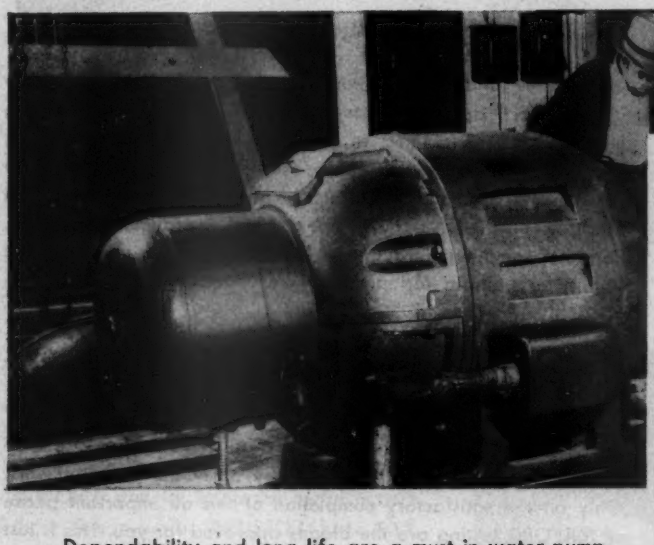
MILFORD METAL CUTTING MEMOS . . . MILFORD has prepared this interesting, informative literature for you. Containing much useful information on metal cutting — the latest in MILFORD product information too — it is part of MILFORD'S consistent effort to help you get the maximum in long, efficient performance from your MILFORD blades. Your local MILFORD distributor has a supply on hand. See him today, or, write direct to the factory.

MILFORD

METAL CUTTING SAW BLADES
REZISTOR & DUPLEX HACK SAW BLADES
PROFILE & BAND SAW BLADES

DEPENDABILITY where it counts

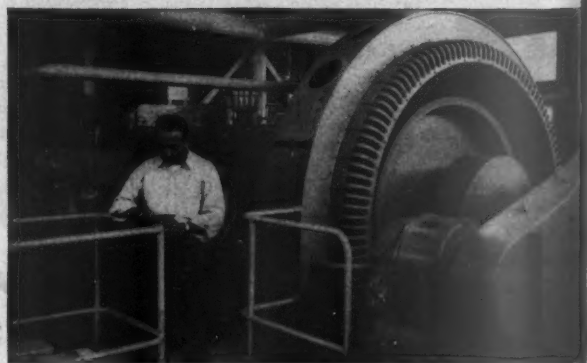
SYNCHRONOUS MOTORS



Dependability and long life are a must in water-pumping equipment. Cohoes, N. Y. selected a G-E Tri-Clad* 500-hp synchronous motor for their raw-water pumping station. And as protection against a short-circuit capacity of 60,000 kva, Cohoes selected G-E Limitamp high-voltage control. Besides providing accurate control for the motor, Limitamp clears shorts from the line in less than half a cycle—before damage can come to either motor or control. Ask your nearest G-E sales office for more information on Limitamp control.

* Reg. U. S. Pat. Off.

ON CRITICAL PUMPING OPERATIONS



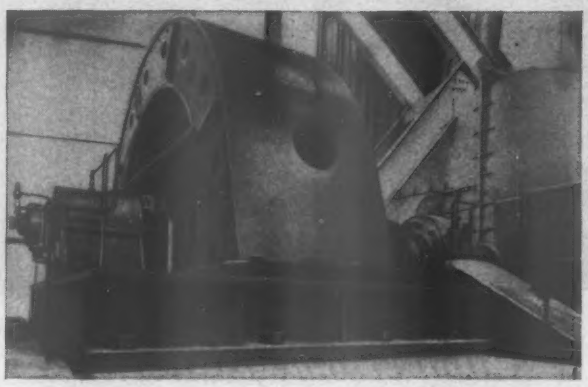
Driving compressors in gas pumping station serving hundreds of homes, motor requirements were—dependability and low cost. This G-E 1500-hp synchronous motor scores on both counts.

FOR SPECIAL SERVICE CONDITIONS

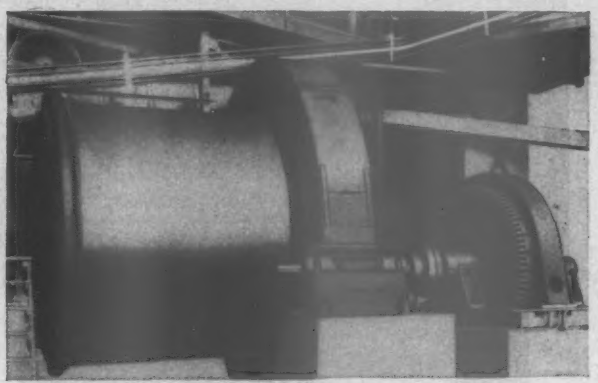
Corrosive, dust-laden atmosphere has no effect on this externally ventilated synchronous motor. Installed in a plastics mill, it's typical of the special enclosures that can be designed to meet almost any operating problem.

These gas compressors created a hazardous atmosphere for motor operation. The external enclosure of this 300-hp, G-E synchronous motor is filled with an inert gas to provide reliable operation.

FOR TOUGH JOBS



A motor must be rugged to drive a large wood chipper capable of chewing 40-inch diameter logs into small pieces. This G-E synchronous motor, with rigid, box-type construction will give years of dependable service—on a *tough* application.



To meet the rough test of driving a ball mill, this mining company chose a G-E high-torque synchronous motor rated at 600 hp. It's given them years of dependable operation and still going strong.

SAVE MONEY, TOO

It's a fact . . .

Lower Operating Costs,
higher operating efficiency.

Lower Initial Cost
including control and exciter—for many ratings.

Reduced Demand
and release of needed generating capacity.

Reduced Power Rates
for improved power factor.

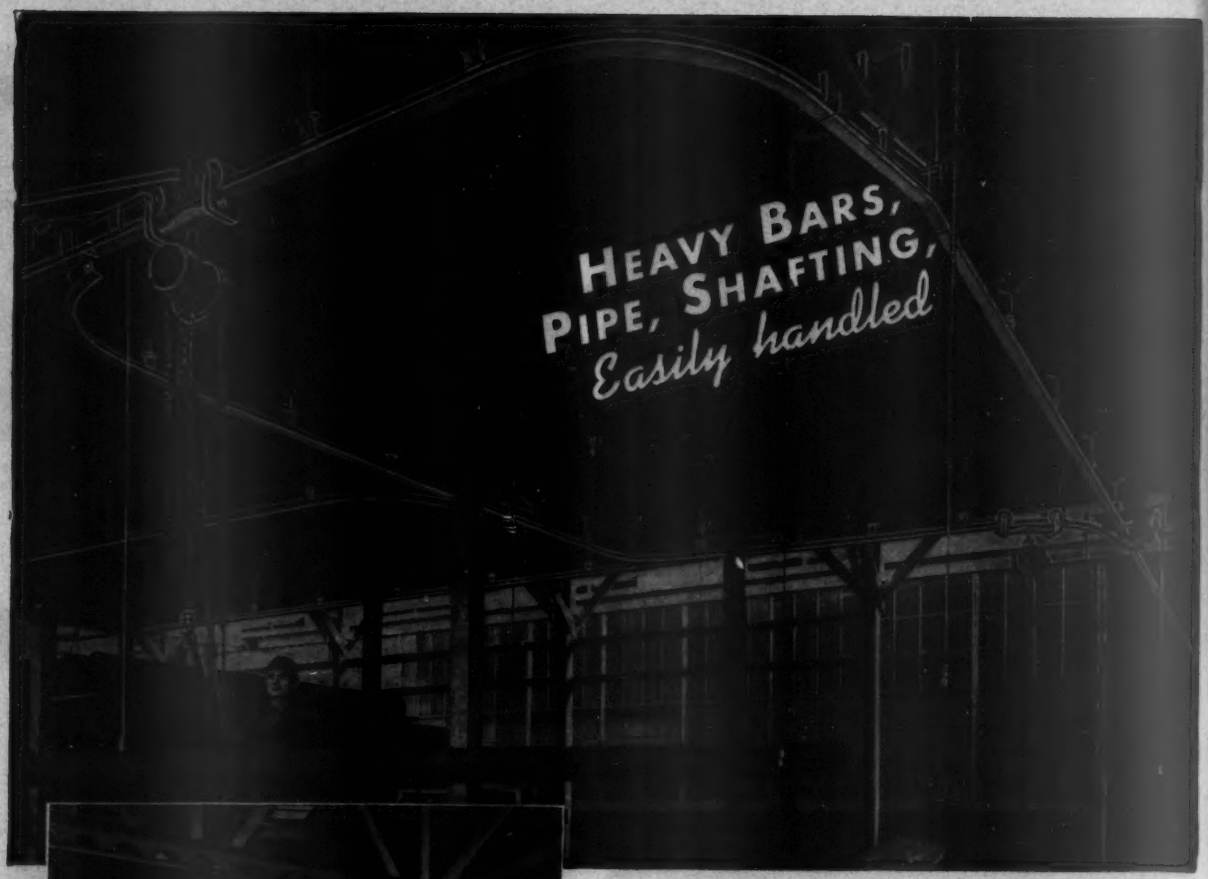
Application engineers, with many years of field experience, will tailor G-E synchronous motors and control to *your* job. And, no matter where you are located, there's a G-E Service Shop near you.

For your next large, synchronous motor application, call in your General Electric representative—he'll be glad to discuss with you, your particular application. For more information on G-E synchronous motors, write for GEA-5332 (low-speed) or GEA-5426 (High-speed) to: *Section 770-24, General Electric Company, Schenectady 5, New York.*

You can put your confidence in—

GENERAL ELECTRIC

770-24



Workmen find Cleveland Tramrail equipment very easy to operate. A starting effort of only 15 lbs. and a running effort of 10 lbs. is required per ton weight.

Cumbersome Materials Moved Quickly and Safely

An overhead crane (see photo at left) for handling materials in one section of a shop, or a Tramrail System (see photo above) for direct transportation to all points in a plant, simplifies the hard job of moving heavy, awkward materials. Work that strains the backs of two or three men can usually be handled with ease by one man in a fraction of the time.

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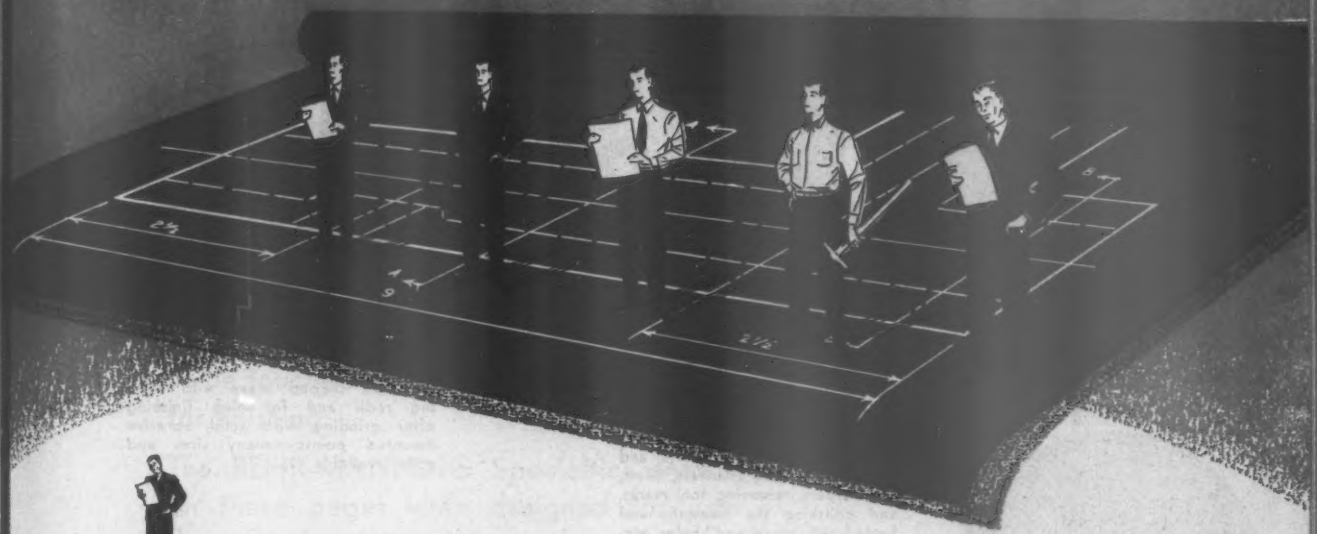
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3223 EAST 284TH ST. *WICKLIFFE, OHIO*

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Everybody SHOULD get into the act..

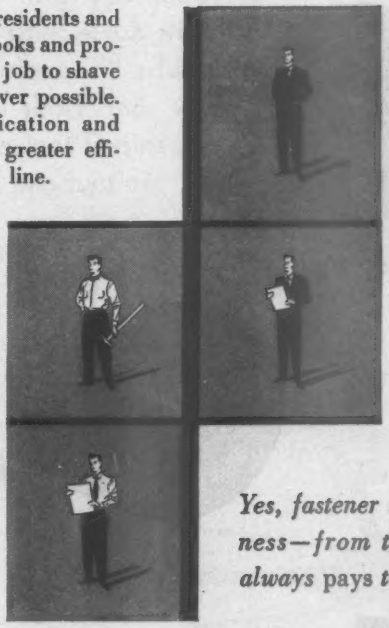
For top efficiency in fastener selection



TOP MANAGEMENT—Boards of Directors, Presidents and Treasurers are guardians of company pocketbooks and protectors of the stockholders' interests. It's their job to shave production costs and boost net profits wherever possible. Choosing the right fasteners for all fabrication and assembly jobs can contribute much toward greater efficiency, and cash savings on the production line.

DESIGNER—*The Designer makes the original recommendations on fasteners. A full knowledge of the types of fasteners available, and, the jobs they are engineered to do, is essential. Lamson & Sessions will be happy to send information of this kind on request.*

ENGINEER—The Engineer is concerned with the smooth, efficient mechanical operation of the finished product. Fasteners play a vital part in his calculations. Tolerances, tensile strengths and metal characteristics are of interest to him. Lamson & Sessions' "fastener engineers" can supply this information gratis.



PRODUCTION MAN—*Speed and efficiency on the production line is of primary importance to the Production Man. There can be no time-wasting fumbling, heads must not shear or ream under power driver torque, fastener fit must be uniform. The production line is the final test of true fastener worth.*

PURCHASING AGENT—The Purchasing Agent has the choice of sources for specified fasteners. The first thought of thousands of smart "P. A.'s" is Lamson & Sessions, the "full line" manufacturer where strict Quality Control guarantees dependable fasteners.

Yes, fastener selection should be everybody's *business—from the "top brass" down. Remember, it always* pays *to pay attention to fasteners!*

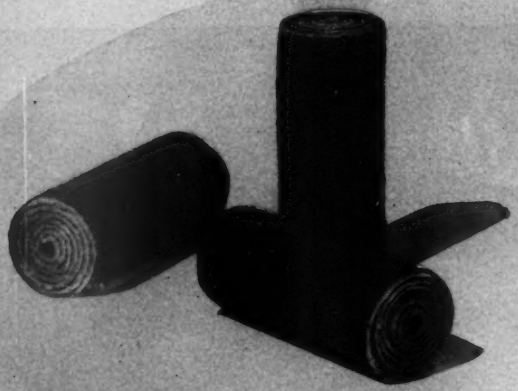
The home of "quality controlled" fasteners

Lamson + Sessions

The LAMSON & SESSIONS Co. • General Offices: 1971 West 85th Street • Cleveland 2, Ohio

Plants at Cleveland and Kent, Ohio • Birmingham • Chicago

GOT AN UNUSUAL



LIGHTNING METALITE CLOTH PENCILS

In various lengths, diameters, and grits for polishing channels, fillets, and corners, removing tool marks, and polishing the sidewalls and bottoms of "dead end" holes, etc.

LIGHTNING METALITE CLOTH SPIRAPOINTS

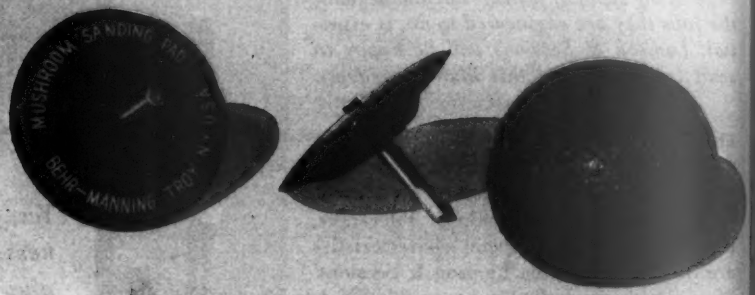
For odd shaped areas with varying radii and for high finishing after grinding with solid abrasive mounted points — many sizes and grits available.

METALITE CLOTH SLOTTED DISCS

Cut to fold in, like an umbrella when pushed into a hole — just the thing for internal polishing on walls of cylinders and for deburring and radiusing the edges of round holes. Available in complete range of diameters and grits.

MUSHROOM SANDING PADS

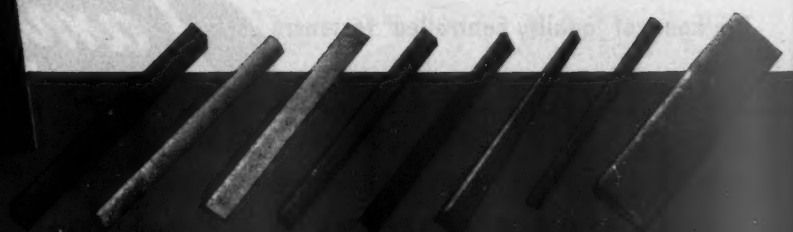
For shaping and finishing dies and moulds in various metal and rubber fabricating — also used in deburring and finishing curved or flat surfaces.



OILSTONE FILES FOR THE FINAL "TOUCH"

Over 200 different sizes and shapes of INDIA* and HARD ARKANSAS* stones enable you to fit dies, deburr an intricately shaped machine part, or put a real keen edge on precision cutting tools.

*Trade Mark



COATED ABRASIVES • SHARPENING STONES • PRESSURE-SENSITIVE TAPES

FINISHING JOB?

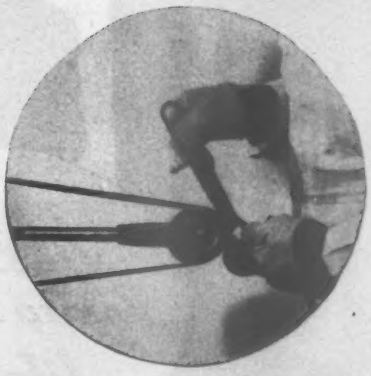
BEHR-MANNING *Special* ABRASIVE TOOLS

Maybe it's a volume job with a corner to be rounded, a channel to be polished, an edge to be deburred, an inside surface to be touched up, or a spot tough to reach for finishing.

The BEHR-MANNING Specialties shown on these pages were designed for just those kinds of jobs. Look them over — probably you'll find just what you need. In any case, if you have a special job where a few minutes saved per piece will add up to greater production, a short talk with a BEHR-MANNING Abrasives Engineer may give you that improved production. Write us. Address Dept. F-5.

SPIRABANDS

Fit expanding rubber drums for deburring and finishing exterior and interior metal with portable sanding tools. Strong, double-thick cloth backing available in METALITE®, ADALOX®, DURITE®, and GARNET, in complete range of diameters and grits.



NEW YOKE SANDER

For belt finishing and polishing small contours and difficult radiusing that formerly required set-up bobs or wheels. This sander is extremely versatile and efficient and can be used vertically or horizontally as illustrated.

BEHR-MANNING®

NORTON abrasives®

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CO-ORDINATED ENGINEERING DESIGN
DO NOT LUBRICATE
Life-Linestarter
PAIRED FOR PRODUCTION
Life-Line motor

EXTRAS like these assure long-range performance

You get more than a motor and a starter when you install these Life-Lines. You get complete design, engineering and service every step of the way.

CO-ORDINATED ENGINEERING DESIGN makes sure that Life-Line motors and Life-Linestarters give long-range performance. They're made together to work together.

RESEARCH, DEVELOPMENT AND TESTING in Westinghouse laboratories result in such features as:

Steel frame
Pre-lubricated bearings... in Life-Line motors
"De-ion"® arc quenchers
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APPLICATION ASSISTANCE to help you select the right motor and control.

Application engineers for your daily problems
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All at your service without obligation.

UNIFIED RESPONSIBILITY . . . for operation of the motors and protective controls.

One supplier . . . makes your work simpler.

MAINTENANCE SERVICE is all-inclusive and nationwide.

36 fully-equipped repair shops
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Who else can offer all these EXTRAS?

More details? Ask your Westinghouse representative. Call him today. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21637

His right hand is on SKIL's exclusive, patented contour-grip handle—left hand covers the convenient nose knob of this SKIL Belt Sander. No awkward handling, no crowded, cramped fingers with SKIL Belt Sanders. Belt changes are made in seconds thanks to SKIL's "touch-control" lever. Finish sanding work goes fast and easy here on this stainless steel "Anets" 4-tube, 20" x 20" bakery fryer.

SKIL Saws

SKIL Sanders

SKIL Grinders

SKIL Sanders

SKIL Shear

SKIL Drills

SKIL Grinder

produce sparkling finishes

at Anetsberger Brothers, Inc.

SKIL Disc Sanders and SKIL Belt Sanders help increase sales-appeal of famous "Anets" Bakery and Food Serving Equipment

Look at the smooth, gleaming, ripple-free finish on each stainless steel "Anets" product. Note how these bright, shiny finishes add extra "buy-appeal"—assure effortless cleaning and maintenance. Think how easily, how economically SKIL Sanders can produce similar results in *your* finishing operations on metal, wood or compositions!

Like many other manufacturers of high quality products, Anetsberger Brothers, Inc., Northbrook, Illinois, have found SKIL Portable Tools fast, efficient, dependable. SKIL Belt and Disc Sanders, SKIL Drills, SKIL Screwdrivers and SKIL Saws *all* play an important part in production line and maintenance work in the large Anetsberger Brothers plant.

Ask your SKIL Tool Distributor to demonstrate SKIL Sanders and other famous SKIL Tools today!

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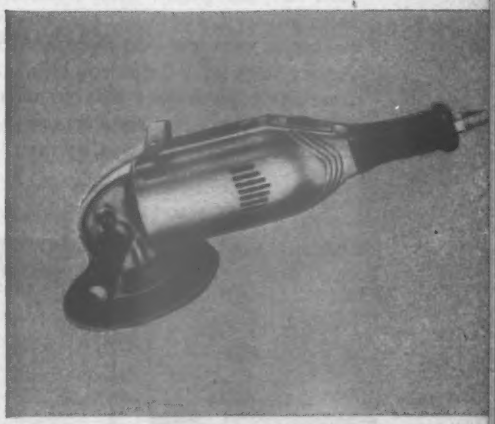
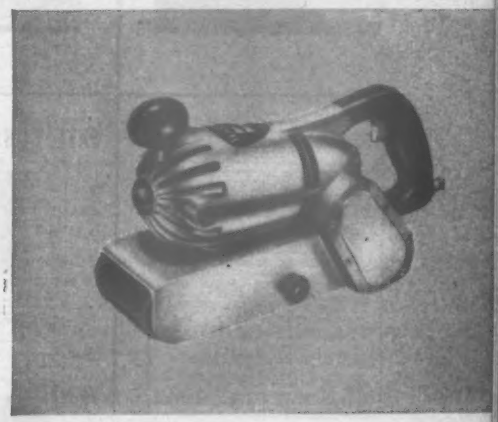


SKIL Disc Sanders—6 powerful models



SKIL Belt Sanders—4 powerful models

This "Anets" 14-inch restaurant fryer gets a fast, thorough polishing with a powerful SKIL Disc Sander. The wire brush takes good care of the "hard-to-reach" spots. SKIL Disc Sanders can easily solve *your* sanding, cleaning and polishing problems—*try one on your production line for proof!*

SKIL

Get the ONE BEST Adhesive for the job!

Don't take chances on the packaging adhesives you use! Let our skilled laboratory staff study your problems and *prescribe* the one best adhesive for each specific labeling or sealing operation in your plant. That's the sure way . . the safe, modern, economical way to buy the glues, pastes or cements you need. PAISLEY Scientific Adhesive Service helps you eliminate loose, torn, unsightly packages due to using the wrong adhesive. And it protects you against lack of uniformity and poor quality thru *"continuous control"* . . a laboratory method of insuring that each succeeding shipment measures up to the same high standards of uniform fine quality and performance.

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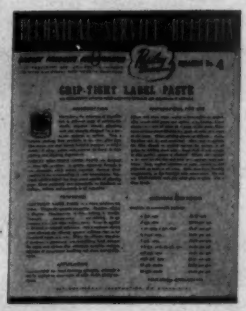

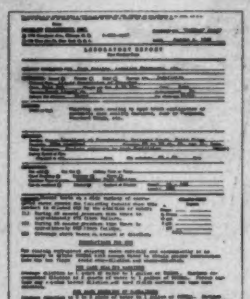

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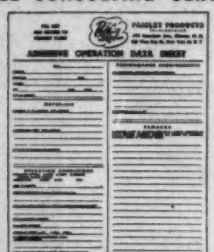

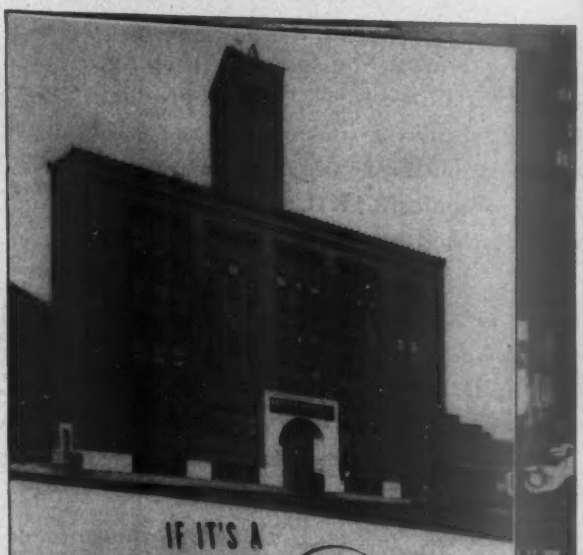

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acrylic fiber

With "ORLON" acrylic fiber now in commercial production as a continuous filament yarn, interest in the possibilities of this latest Du Pont textile product has been growing every day . . . in the textile industry, in manufacturing, among consumers. To help you plan products featuring "ORLON". . . or to encourage your thinking on ways of improving your production process with "ORLON". . . here are some basic facts about the new man-made fiber that you should know.

FOR PRODUCTS EXPOSED TO WEATHER,

"ORLON" offers outstanding resistance to sunlight, soot and acid fumes . . . plus superb resistance to damage from moisture, mildew, insects, molds. This means that awnings, beach umbrellas, garden furniture, sewing thread, tents, yacht sails can have durability never before possible.

FOR FABRICS SUBJECT TO HEAT AND CHEMICALS,

"ORLON" has high potential . . . is already serving industry in filters, electrical insulation, acid-resistant work clothes. Excellent dimensional stability, high flex life and good abrasion-resistance further contribute to the usefulness of "ORLON" in the industrial field.

FOR LIGHT WEIGHT

with no loss of strength, comfort, bulk or covering power, properly made fabrics of "ORLON" are unsurpassed. Just imagine the tremendous advantage of lighter weight apparel fabrics without any sacrifice in comfort . . . lighter weight industrial fabrics without loss of strength or durability. These characteristics, too, promise a bright future for "ORLON."

FOR STRENGTH,

fibers of "ORLON" are in a range with other high-strength fibers. Moreover, "ORLON" combines tenacity with low moisture sensitivity and high stretch resistance—factors which make for ease of processing. These qualities of "ORLON" open up a wide variety of applications where general durability is an important factor.

FOR EASE OF CARE,

correctly engineered fabrics of "ORLON" stand second to none. They are easy to wash . . . need no stretching . . . dry rapidly without losing their shape . . . require little or no pressing. What's more, "ORLON" in almost any use has a most pleasing appearance—and a warm friendly feeling.

In addition to having a unique combination of desirable qualities, "ORLON" can be processed by any standard textile operations . . . including twisting, winding, warping, slashing, quilling, weaving, circular and tricot knitting, and finishing. Satisfactory procedures for sizing "ORLON" yarn have been developed . . . though these techniques are being given further study.

Clearly, the properties and handling characteristics of "ORLON" promise improvements in many existing textile products and new fields of use for man-made fibers. On the other hand, it should be remembered that no one fiber serves every need—and "ORLON" is no exception.

Continuous filament "ORLON" is in commercial production; limited quantities of "ORLON" staple are being used for experimental work. Why not evaluate "ORLON" in terms of your own business? For additional information, write E. I. du Pont de Nemours & Co. (Inc.), Acetate Division, Wilmington 98, Delaware.

DU PONT

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

HOW to plan ahead for your roofing maintenance

The Built-Up Roof Survey will give you an exact report on the condition of your roof. This free Johns-Manville service helps you plan your present and future needs

TAKE ADVANTAGE of this *free* Johns-Manville service to find out the exact condition of your built-up roof. It will enable you to make plans *now* for repairs and maintenance in the future. That's what plant engineers and maintenance executives *like* about the J-M Roof Survey Plan.

Don't take *your* roof for granted, even though it doesn't *seem* to be leaking. Many a roof with torn flashings, dried-out felts, even rotted decks has been *assumed* to be in "good condition." The Roof Survey Report will cover all the critical areas . . . flashings, deck, roofing felts, parapet walls, skylights, etc. It will be an accurate picture by a roofing *expert*—the Johns-Manville Approved Built-Up Roofing Contractor. And it will cost you only the trouble of *asking* for it.

Let us send you the interesting booklet, "Things You Should Know About Your Roof." It gives complete information about the *free* J-M Roof Survey Plan, together with the full story of the J-M Flexstone* Asbestos Roof and the Asbestile* Flashing System. Write Johns-Manville, Box 158, New York 16, New York.

Johns-Manville
Box 290, New York 16, New York

Please have one of your Approved Built-Up Roofing Contractors see us about making a free survey of our roof.

Name _____

Address _____

_____

*Reg. U. S. Pat. Off.

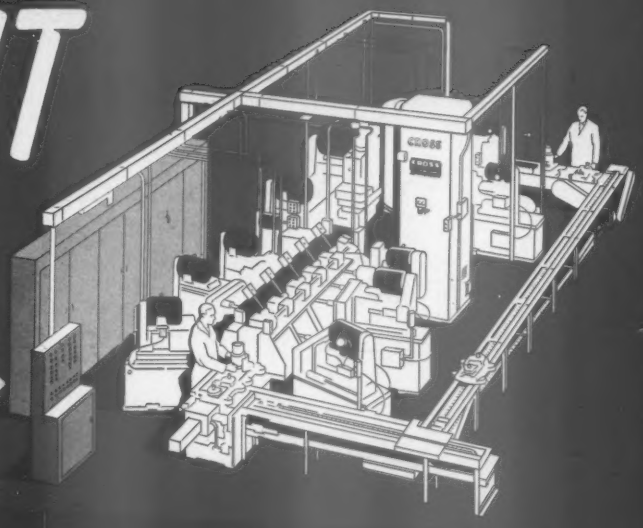
Made of ASBESTOS

Johns-Manville FLEXSTONE* Built-Up Roofs

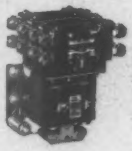
ASBESTOS CORRUGATED TRANSITE* • ACOUSTICAL CEILINGS

DECORATIVE FLOORS • MOVABLE WALLS • ETC.

120 UNIT CONTROL PANEL . . .



Panel Components



Bulletin 700 solenoid relay . . . dependable . . . consistent . . . in closing and opening time.

Bulletin 709, Size 0, open type solenoid starter. Simple design assures trouble free operation.

Bulletin 709, Size 2, open type solenoid starter. A-B control is known for its reliable motor overload protection.

. . . integrates the operating sequence of this huge production machine . . .

This marvel of complete automatic operation . . . is the Cross Transfer-Matic Machine for machining automobile transmission cases.

Over one hundred individual operations are co-ordinated into an automatic machining sequence. Obviously, split second, trouble free operation of the control is essential to justify the cost of such a machine.

All Allen-Bradley solenoid contactors on this control board have but one moving part. There are no links, levers, pins, pivots, or bearings to corrode, stick, or affect the time of operation. Such simplicity guarantees trouble free performance.

The overwhelming preference of machine tool builders for Allen-Bradley controls is easy to explain. No other controls are so trouble free. Descriptive bulletin will be mailed on request.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

A-B Quality

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

451-M

TROUBLE FREE CONTROLS

FOR SIMPLE OR COMPLEX SEQUENCE OPERATIONS

Keen machinery designers take full advantage of the precision performance and dependability of Allen-Bradley motor controls. The consistent timing of opening and closing provides precision co-ordination of machining operations. The result is increased output without loss of safety.

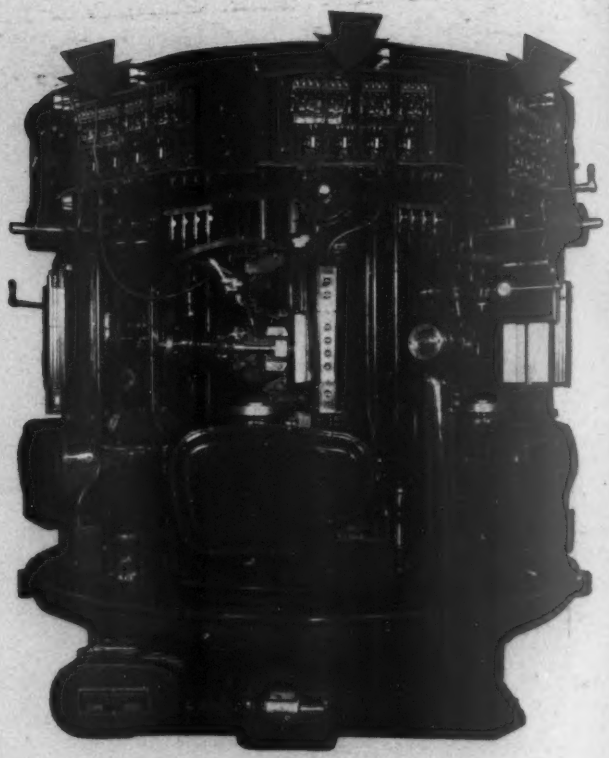
Let us show you, without obligation, how to use solenoid controls on your machines to best advantage.

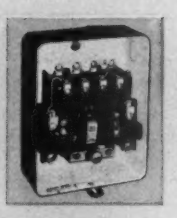
SINGLE MOTOR DRIVES—The Cincinnati Shaper Company furnishes, as standard factory equipment on these machines, an Allen-Bradley solenoid starter with a Start and Stop push button station near the operator. While this is a simple, one motor drive, the Allen-Bradley Bulletin 709 starter does more than merely start and stop the motor.

Accurate and dependable overload protection is provided by two Resistotherm overload relays in the starter. White interior makes inspection easier.

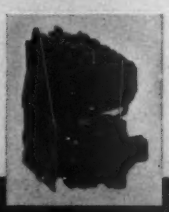
The "no voltage" protective feature of these starters prevents the motor and machine from restarting accidentally after line or fuse failure.

Complete protection is assured for man, motor, and machine at all times.





Allen-Bradley motor starters are available in various enclosures such as general purpose, watertight, dust tight.



Allen-Bradley switches and starters are self insulated, and can be grouped closely in gangs on metal panels or in machine bases.

MULTI-MOTOR DRIVES—Lees-Bradner Company of Cleveland, Ohio, designed this 8-spindle gear hobbing machine with 27 electric motors. This automatic rotary tool required a complex system of automatic sequence controls. In the illustration, above, are shown some of the control panels around the top of the machine. The total control system required 118 Allen-Bradley starters, relays, limit switches, and push buttons.

Leading machine tool builders have standardized on Allen-Bradley solenoid controls, because they are so dependable and trouble free.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. 451-M

A-B Quality

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

Pick the V-Belt Sheave

which all industry likes best

QD
TRADE MARK

Split hub is clamped to shaft. Heavier taper-bored rim slides easily over tapered hub—no keyway obstruction on cone surface. Positive press fit on shaft. Large, long pull-up bolts also used as jack screws to remove rim.

Here's a 26-word description of the V-belt sheave that is used more than any other.*

Two parts for easy handling—separately or together. Split hub and tapermated rim make mounting easy. No realignment problem—clamped hub stays put while changing rims.

That's Worthington's QD—the original tapered cone-grip sheave that's preferred by men who have to install or change sheaves. The QD is *easy to get on, easy to get off, yet always tight on the shaft* —tighter than any other sheave on the market. Hubs for every bore—lower inventory cost.

For your machines, pick Worthington Multi-V-Drives with QD sheaves and Worthington-Goodyear EC Cord V-belts.

Complete range of stock sizes—prompt shipment from distributors everywhere.

**In addition to being one of the largest-selling sheaves, the popular Worthington QD design is licensed to many other sheave manufacturers. For your protection, dimensions are standardized to permit interchangeability.*

The water failed,

the light almost failed...

but the distributor "came through"

A hydro-electric plant, crippled by drought, was threatened with losing its franchise; was given 60 hours to bring its service up. Two Diesel engines were about to arrive when somebody remembered to order the V-belt drives.

A call to Anderson-Crane Rubber Company, Worthington distributor in Minneapolis, located four large D-section QD sheaves and 25 Worthington-Goodyear steel cable V-belts. These were rushed by car at night to the power plant, arriving just ahead of the engines. Within 24 hours, the plant was producing full power.

Once again, the Worthington distributor was *on the job*—with the needed supplies and the prompt service!

WORTHINGTON

THE GOOD RIGHT HAND OF INDUSTRY

POWER TRANSMISSION: sheaves, V-belts, variable speed drives

PUMPS: centrifugal, power, rotary, steam

AIR COMPRESSORS: water-cooled, air-cooled

Worthington Pump and Machinery Corporation
Multi-V-Drive Sales Division
Buffalo, New York

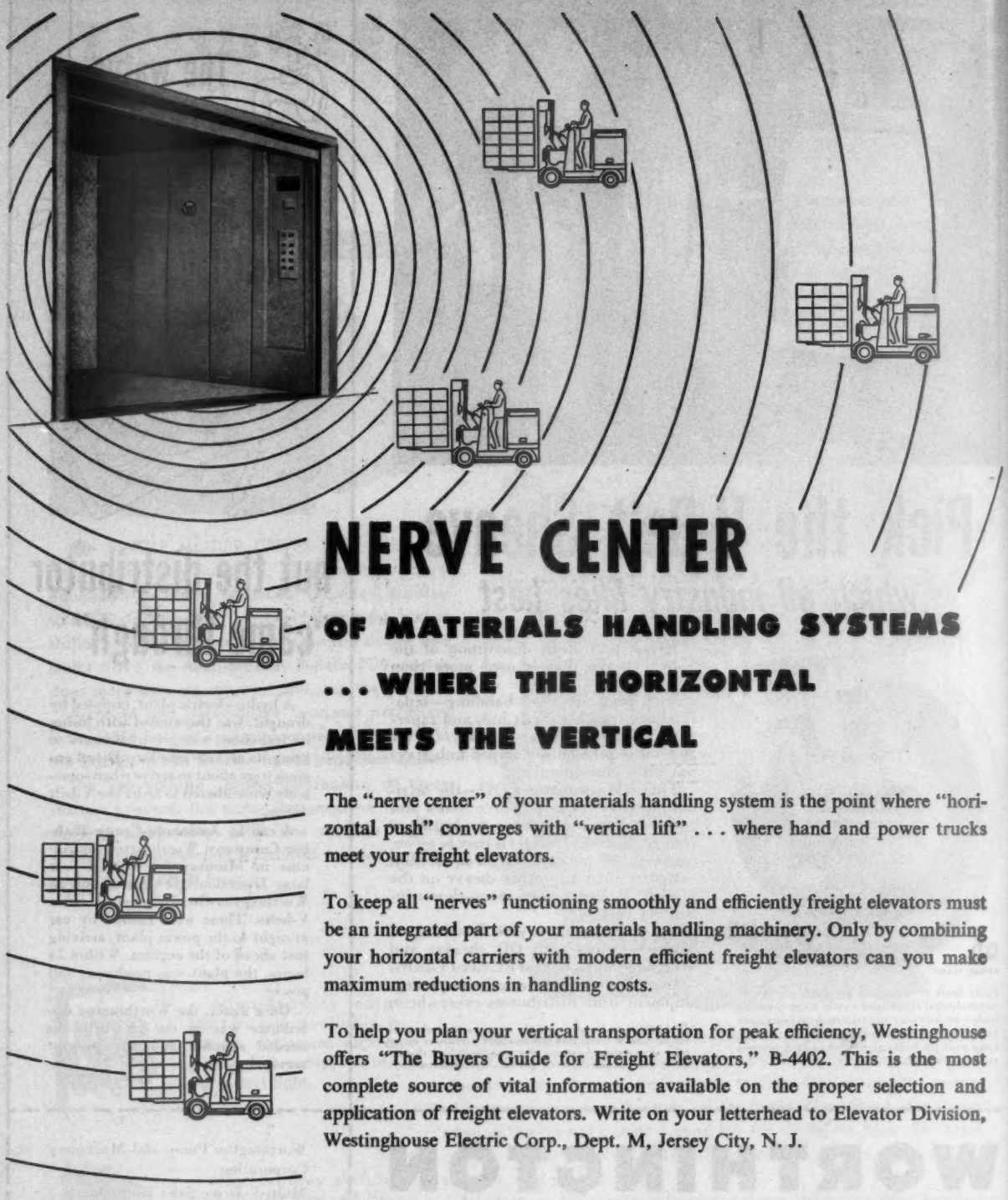
Send Bulletin V-1400-B7F on Worthington Multi-V-Drives.

Name.....

Company.....

Address.....Zone....State...

MV.1.3



NERVE CENTER

OF MATERIALS HANDLING SYSTEMS ... WHERE THE HORIZONTAL MEETS THE VERTICAL

The "nerve center" of your materials handling system is the point where "horizontal push" converges with "vertical lift" . . . where hand and power trucks meet your freight elevators.

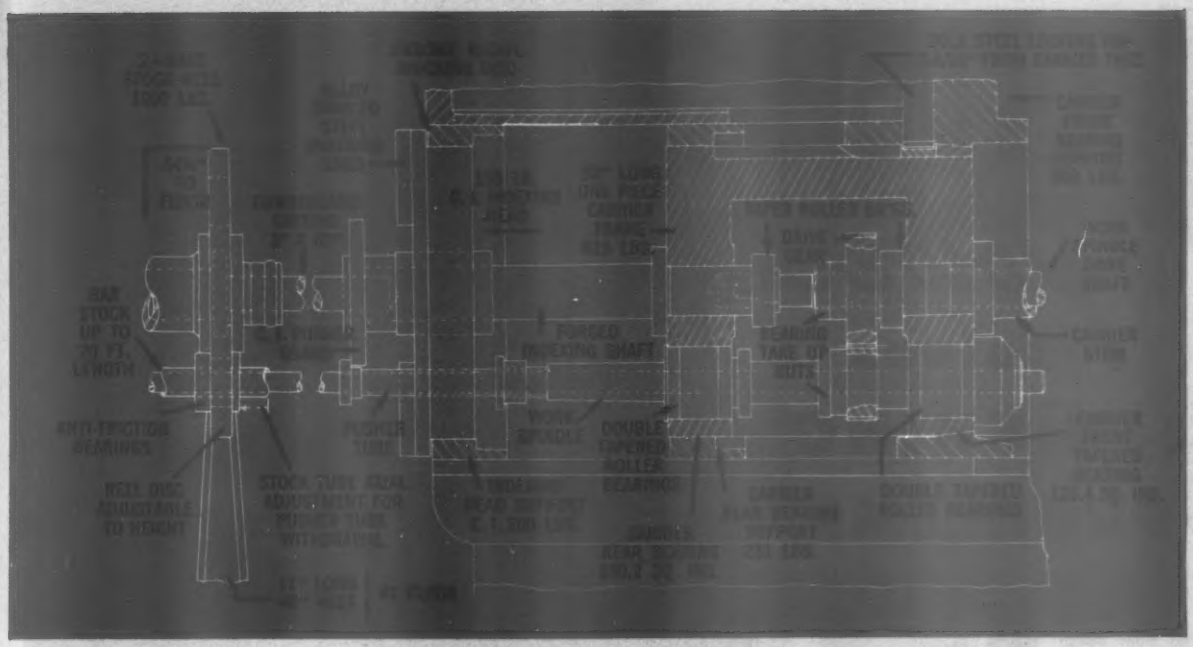
To keep all "nerves" functioning smoothly and efficiently freight elevators must be an integrated part of your materials handling machinery. Only by combining your horizontal carriers with modern efficient freight elevators can you make maximum reductions in handling costs.

To help you plan your vertical transportation for peak efficiency, Westinghouse offers "The Buyers Guide for Freight Elevators," B-4402. This is the most complete source of vital information available on the proper selection and application of freight elevators. Write on your letterhead to Elevator Division, Westinghouse Electric Corp., Dept. M, Jersey City, N. J.

WESTINGHOUSE FREIGHT ELEVATORS

J-98601

YOU CAN BE SURE... IF IT'S Westinghouse



FIRST THINGS COME FIRST

Upon the Spindle Carrier of an "Automatic" falls the responsibility of accurately presenting and holding the work to — and in contact with — the tools. The basic design of the Carrier is obviously of first importance in the protection of the work spindles from the strain of heavy cuts and weight of the bar stock. Then, in proportion to the Carrier's ability to handle the full load is the importance of any supplementary facility that shares the load.

1. **The 1½" Six Spindle CONOMATIC CARRIER gives better support to the work spindles under heavy loads.**

   The thick, heavy ribs resist strain. The tapered front bearing and the spindle drive gears are within 3" and 9¼", respectively, of the collet faces. The wider spaced bearings give better alignment and load distribution. The Carrier is free of Cross Slide positive stop pressure.

2. **The entire INDEXING MECHANISM is supported by the Top Bed as well as the Base. There are fewer wearing parts.**

   The Indexing Head takes the brunt of the indexing load. It is supported by the short frame member midway between the Carrier and the Stock Reel. It is joined to the latter by strong center shafts.

3. **The STOCK REEL is designed to handle longer and heavier loads.**

   The two Stock Reel Bases are independent of the machine and relieve it of the heaviest part of the bar load during the cutting and indexing movements. Adjustable alignment gives freer stock-feed action.

Buyer's Comparison Chart will guide you to full information

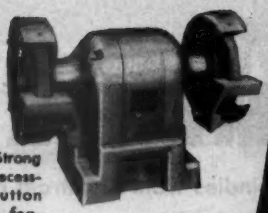
A Comparison of ALL Automatics is in Favor of Cone

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

VAN DORN *Power* solves FINISHING PROBLEMS

Van Dorn Sanders drive discs, grinding wheels, wire brushes—to speed up sanding metal and wood, grinding down welds and casting ridges, removing rust, paint and scale, shaping and semi-finishing lumber, many other jobs. "Special," "Standard" and Heavy-Duty models.



Van Dorn Bench Grinders handle tool sharpening, grinding, wire brushing, buffing. Streamlined for better working clearance. Strong steel wheel guards, recessed 2-pole, push-button switch, other safety features. 6", 8" and 10" models.

Van Dorn Portable Grinders let you bring the tool to the work when work is heavy, bulky, hard to move. Speed up grinding, cleaning, buffing, wire brushing. 3" to 6" wheel sizes.

Van Dorn Polishers have correct speed and power for polishing stainless steel, furniture, mirrors, many other industrial products. 7" Automatic model has *exclusive* polish feed; "Special" and "Standard" models available.

See your nearby Van Dorn Distributor first when you have a finishing problem in your plant. He'll show you how to cut costs, speed up jobs with the *right* tool for *every* job from the big Van Dorn Line. And you get such world-famous features as: (1) Dependable, full-powered motors tailor-made by Van Dorn for the tools they drive; (2) Perfect balance for easy handling, less worker fatigue; (3) Tough, longer-wearing parts for extra years of service and lower tooling costs! Write for free catalog to: THE VAN DORN ELECTRIC TOOL CO., 719 Joppa Road, Towson 4, Md.

For Power Specify "Van Dorn"

Portable Electric TOOLS

(Div. of Black & Decker Mfg. Co.)

A FOOTE BROS. DRIVE

FOR ANY POWER TRANSMISSION NEED

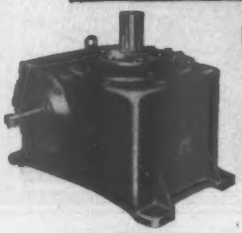
Any requirement for power transmission equipment can be met from Foote Bros. complete line of enclosed gear drives.

Nearly a century of engineering and manufacturing experience is back of these drives. Three large plants contain the newest in gear cutting equipment. New techniques in manufacture—better control of materials—improved manufacturing methods—all assure superior enclosed gear drives. Mail the coupon below for bulletins in which you are interested.

LINE-O-POWER

Economical in original cost and operation, these drives incorporate Duti-Rated Gears which have file-hard tooth services and ductile cores, assuring long life. Compact in design. Available in double or triple reductions, with ratios from 5 to 1 up to 238 to 1 and capacity range from 1 up to 200 horsepower. Write for Bulletin LPB.

VERTICAL DRIVES



HYGRADE

A quality line of heavy-duty drives, incorporating precision worm gearing that assures high efficiency and load-carrying capacity. Vertical output shaft may extend upward, downward or both. Ratios from 4½ to 1 up to 4,108 to 1. Capacity up to 260 horsepower. Write for Bulletin HGA.

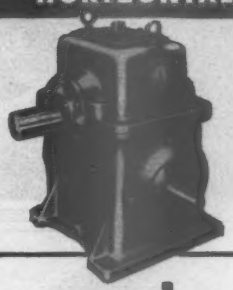
HYTOP

Similar in design to the Hygrade Vertical Drives, but with wider, low-speed bearing span to accommodate long, unsupported vertical output shaft extensions. Vertical output shaft may extend upward, downward or both. Write for Bulletin HGA.

WORM-HELICAL

These drives are admirably suited to applications which require horizontal input and vertical output shafts for heavy-duty service. Available in ratios from approximately 30 to 250 to 1 and a capacity range up to 120 horsepower. Write for information.

HORIZONTAL DRIVES



HYGRADE

High quality, heavy duty, enclosed worm gearing that assures high efficiency and load-carrying capacity. Available in a wide range of types to meet any need. Ratios from 4½ to 1 up to 4,108 to 1. Capacity up to 260 horsepower. Write for Bulletin HGA.

MAXI-POWER

Heavy-duty helical gear drives. Available in single reduction units, ratios up to 9.91 to 1; capacities up to 1,550 horsepower; double-reduction units, ratios from 9.32 up to 71 to 1, capacities to 1100 horsepower; triple reduction units, ratios from 79 up to 360 to 1, capacities up to 420 horsepower. Write for Bulletin MPB.

FOOTE BROS.-LOUIS ALLIS *Gearmotors*

A compact line of gearmotors in 17 sizes in single, double and triple reductions, incorporating Duti-Rated Gears that assure long wear life and maximum load-carrying capacity. Units use Louis Allis high quality motors—available in a wide range of enclosures to meet any condition. Write for Bulletin GMA.

FOOTE BROS. GEAR AND MACHINE CORPORATION
4545 South Western Boulevard, Chicago 9, Illinois

FOOTE BROS.

Better Power Transmission Through Better Gears

Foote Bros. Gear and Machine Corporation
Dept. I, 4545 South Western Boulevard, Chicago 9, Illinois
Please send me the bulletins checked below:

- ☐ Bulletin HGA { Horizontal Hygrade / Vertical Hygrade / Vertical Hytop }
- ☐ Bulletin LPB Line-O-Power
- ☐ Bulletin MPB Maxi-Power
- ☐ Bulletin GMA Foote Bros.-Louis Allis Gearmotors

Name.....*Position*.....
Company.....
Address.....
City.....*Zone*.....*State*.....

How today's craftsmanship is fastened to the past

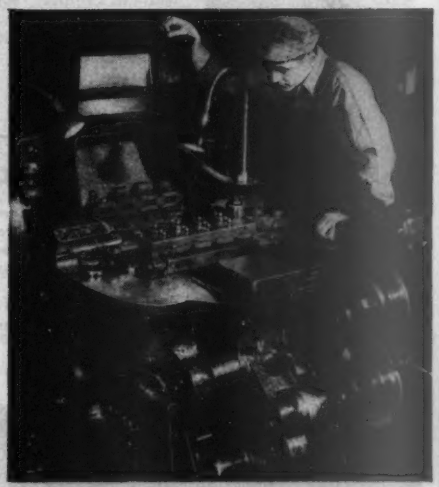
In the early days of the Republic, John Shell began fashioning fine Kentucky rifles . . . lock, stock and barrel.

And though he claimed to be 134 when he died, old John never forgot to give particular craftsmanlike care to the little screws that held lock to stock, for they determined whether or not his rifle would withstand the shock of firing.

Today's makers of guns, tanks, rockets, share John's conviction that the performance of the assembled product depends in no small measure on the performance of its *fasteners*. But in 1951, craftsmanship is available through the aid of *specialists*, like the RB&W worker in the small illustration. He specializes in fasteners alone, devoting a craftsman's skill to producing bolts, nuts, screws and rivets of uniform accuracy, dependability and physical properties.

Backing up his experience is RB&W's continuous research, development work, investment in large expansion and improvement programs . . . 106 years of experience in making the finest fasteners.

Now, more than ever, Russell, Burdsall & Ward is proud that its craftsmanship is helping other craftsmen *make strong the things that make America strong.*

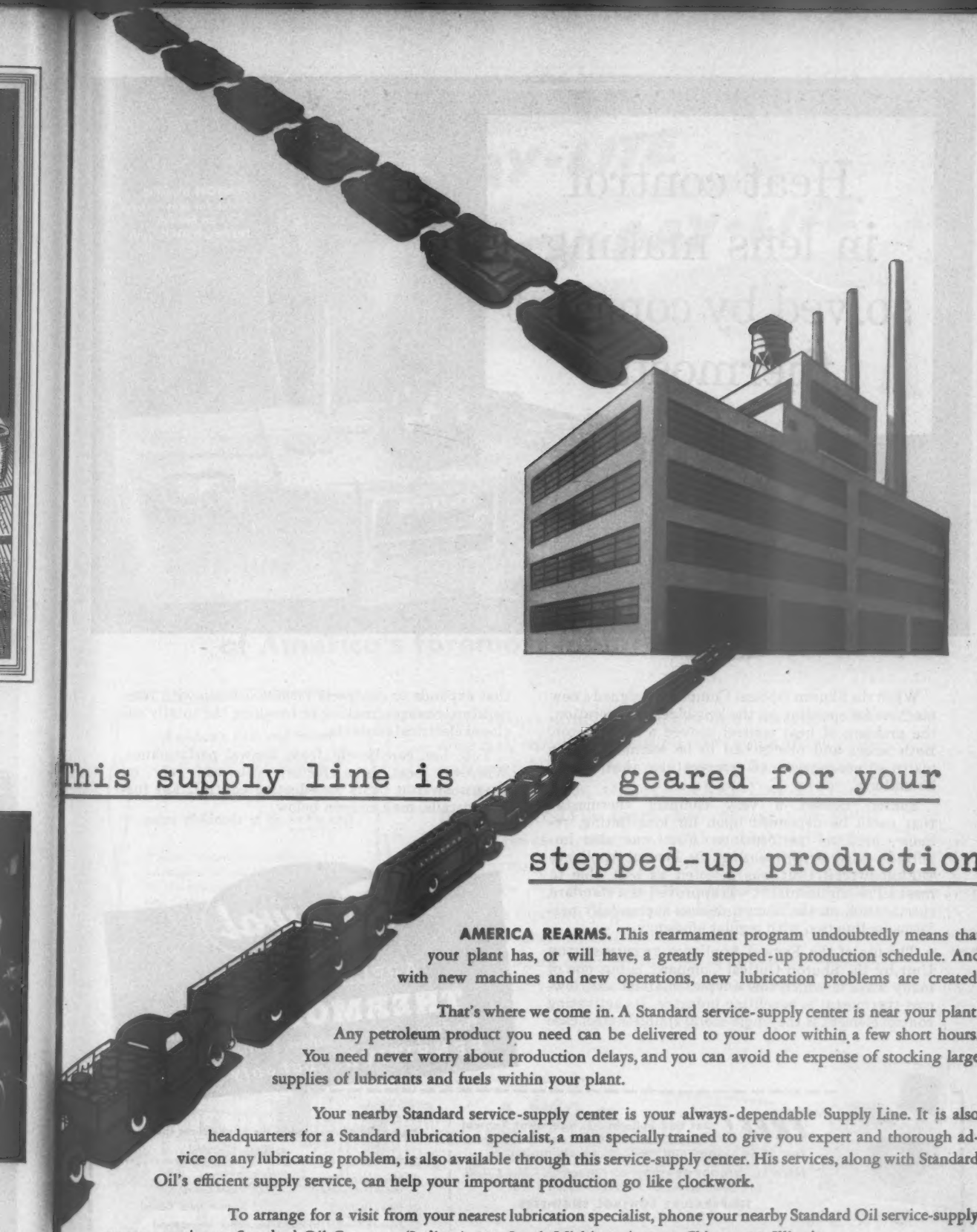


RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W *the complete quality line*

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N. Y., CORAOPOLIS, PA., ROCK FALLS, ILL., LOS ANGELES, CALIF. *Additional sales offices at:* PHILADELPHIA, DETROIT, CHICAGO, CHATTANOOGA, DALLAS, OAKLAND. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*



This supply line is geared for your stepped-up production

AMERICA REARMS. This rearmament program undoubtedly means that your plant has, or will have, a greatly stepped-up production schedule. And with new machines and new operations, new lubrication problems are created.

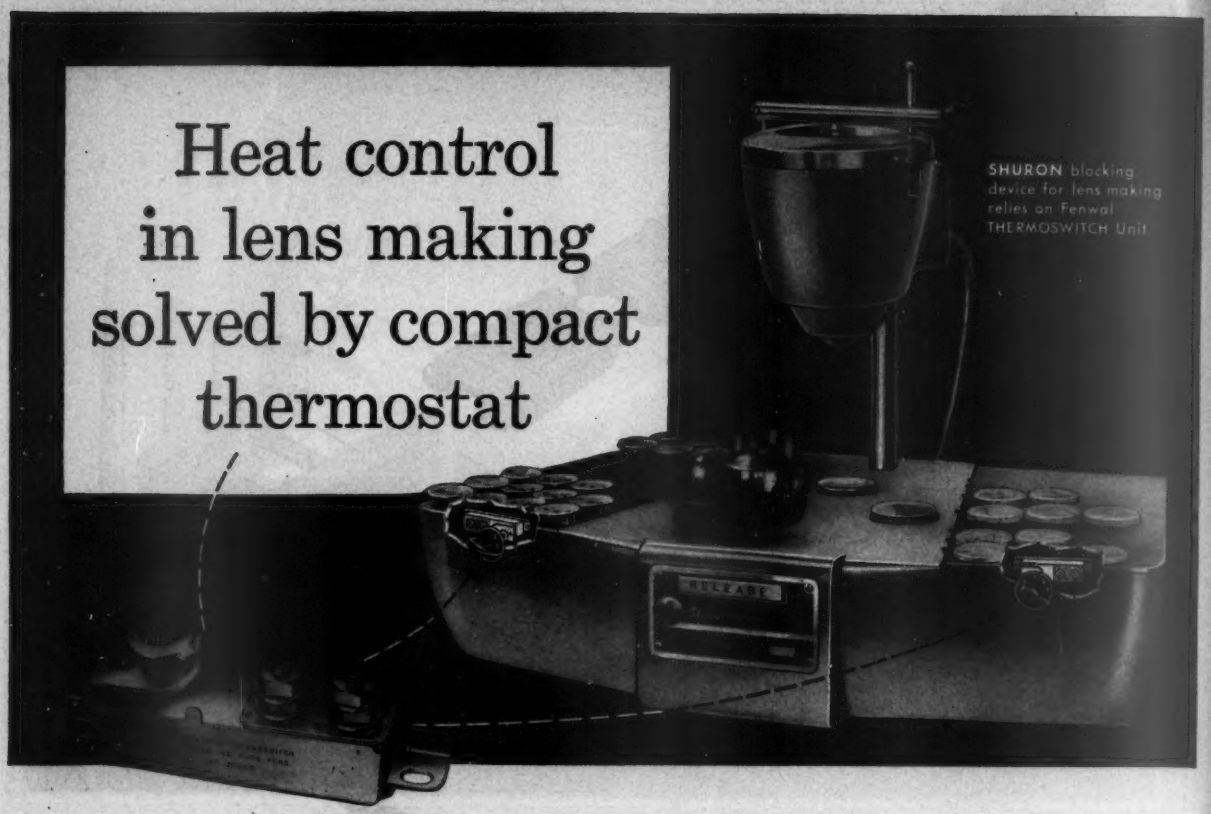
That's where we come in. A Standard service-supply center is near your plant. Any petroleum product you need can be delivered to your door within a few short hours. You need never worry about production delays, and you can avoid the expense of stocking large supplies of lubricants and fuels within your plant.

Your nearby Standard service-supply center is your always-dependable Supply Line. It is also headquarters for a Standard lubrication specialist, a man specially trained to give you expert and thorough advice on any lubricating problem, is also available through this service-supply center. His services, along with Standard Oil's efficient supply service, can help your important production go like clockwork.

To arrange for a visit from your nearest lubrication specialist, phone your nearby Standard Oil service-supply center or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

Heat control in lens making solved by compact thermostat



SHURON blocking device for lens making relies on Fenwal THERMOSWITCH Unit.

When the Shuron Optical Company designed a new machine for speeding up the lens-blocking operation, the problem of heat control proved a vital factor. Both lenses and blocks had to be warmed on hot plates at pre-determined temperatures that had to be uniform.

Shuron needed a very compact thermostat that could be depended upon for long-lasting, reliable, accurate performance. Cost was also important. After experimenting, the Fenwal Appliance THERMOSWITCH Unit was selected as best able to meet all requirements. It was approved as a standard specification on the Shuron device, successfully performs its function with regular efficiency.

The use of the Fenwal Appliance THERMOSWITCH Unit by the Shuron Optical Company is but one of many ways in which this unique, minimal size, low-cost thermostat is benefiting industry. Its activating control element is the single-metal stainless steel case that expands or contracts *instantaneously* with temperature changes, making or breaking the totally enclosed electrical contacts.

You, too, can benefit from Fenwal performance. Wherever heat is a factor, you can rely on THERMOSWITCH Units for effective control. For further details, mail coupon below.

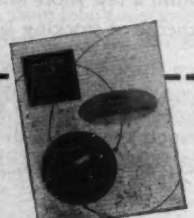
Fenwal

APPLIANCE-TYPE

THERMOSWITCH®

The Precision, Multi-Purpose, Thermostat Control

SENSITIVE... *but only to heat*



FREE! **Get this bulletin . . . see what Fenwal THERMOSWITCH Units can do for you.**
Just fill in coupon and mail . . . no obligation.

FENWAL, INCORPORATED, 65 Pleasant St., Ashland, Mass.
111 South Burlington Ave., Los Angeles 4, Cal.
TEMPERATURE CONTROL ENGINEERS

Name ..... Position .....
Company .....
Street .....
City ..... Zone ..... State .....

I am chiefly interested in the applications checked:

- ☐ Heating
- ☐ Cooling
- ☐ Humidity Control or Detection
- ☐ Alarm (over-temperature, under-temperature)
- ☐ Vapor Control
- ☐ Timing (thermal)
- ☐ Radiant Heat Control
- ☐ Pressure Control (by controlling vapor temperature)

OTHER (Please fill in your special requirements).....
.....
.....

improve working conditions

and speed production

with just one-coat

of America's foremost Maintenance Paint!

America's First and Finest

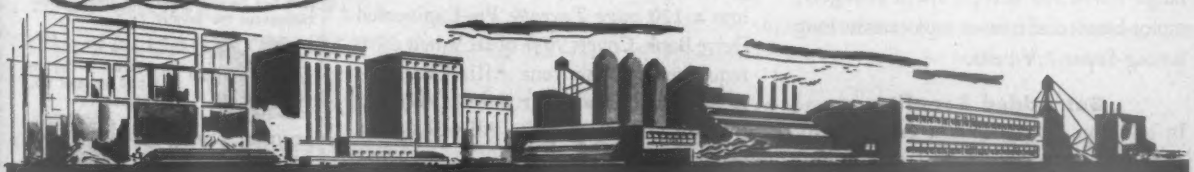
COLOR SERVICE

to make your painting pay

extra dividends at no extra cost

A service comprising detailed color suggestions tailor-made for you by trained consultants from Glidden Color Laboratories with over 21 years of experience. These comprehensive color harmony plans for interior painting based on Glidden's famous Sight Perfection Program pay important extra dividends! For complete information about this free service, write Dept. A-5.

Maintenance paints that will give more years of service after fast, *one coat* application with a minimum of interference in operations are essentially necessary in the defense effort. Glidden SPRAY-DAY-LITE and BRUSH-DAY-LITE heavy duty *one-coat* wall paints meet these requirements. And their high light reflection permits better vision, eliminates fatigue due to eye-strain . . . promotes safety and better employee relations through improved working conditions. You can save man hours, speed production and reduce manufacturing costs by the use of these economical, easy-to-apply wall paints. Try them and see!



Glidden MAINTENANCE PAINTS

QUALITY Glidden PRODUCTS

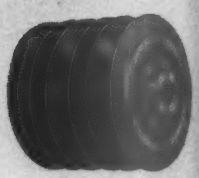
BIG or Small

...EVERYTHING IN V-BELT DRIVES!

NON-STOCK SHEAVES — These sheaves are made to order from stock patterns for A, B, C, D, or E belts, 1 to 1000 hp. For further information check with your *Texrope* drive dealer or Allis-Chalmers Sales Office.

SUPER-7 V-BELT — Famous grommet construction. No splices where failure can start. Rubber cushion supports rayon cord at pitch line. Sizes and sections to suit all operating conditions. All Standard sizes from stock.

VARI-PITCH STANDARD SHEAVE — Speed range of 9% to 28% on drives of 1 to 300 horsepower, using A, B, C, D, or E belts. Two to 10 grooves. These sheaves are available in either motion control or stationary control.



AUTOMATIC *VARI-PITCH* SHEAVES — Offer stepless speed control . . . one to 40 hp . . . 2 to 1 speed range. Move motor forward to increase speed, and back to decrease. One hand does it while motor is running.

***MAGIC-GRIP* SHEAVES**— Fastest mounting sheave you can buy. Aligns easily . . . cannot shake loose. 1 to 12 grooves for A-B, B, C, and D belts. 1 to 250 hp. Stocked in many cities for immediate delivery.

***TEXSTEEL* SHEAVES** — Pressed steel sheaves for applications from ¼ to 25 horsepower. Light weight and rigid. 1 to 6 grooves, A or B belts. All sizes and bores are available for delivery from stock.

***VARI-PITCH* SPEED CHANGER**—Smooth, accurate speed control at turn of hand wheel. Machines operate at exactly the speed for best production. Stepless speed range: 3¾ to 1. Capacity: 1½ to 75 hp.

TEXROPE
Greatest Name in V-Belt Drives

YOU CAN GET every V-belt drive component from the *Texrope* line: Constant speed drives; standard and wide range *Vari-Pitch* drives; speed changers; motor bases; and new or replacement long lasting *Super-7* V-belts.

Get Added Benefits

In addition, you get extra engineering skill both in the field and factory that comes from having more industrial V-belt installations than any other manufacturer.

The world's greatest store of V-belt engineering knowledge has been condensed into a 120 page *Texrope* Pre-Engineered Drive Book. Covers 90% of all V-belt drive requirements. Ask your Allis-Chalmers Authorized Dealer or Sales Office for Bulletin 6956A, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3272

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

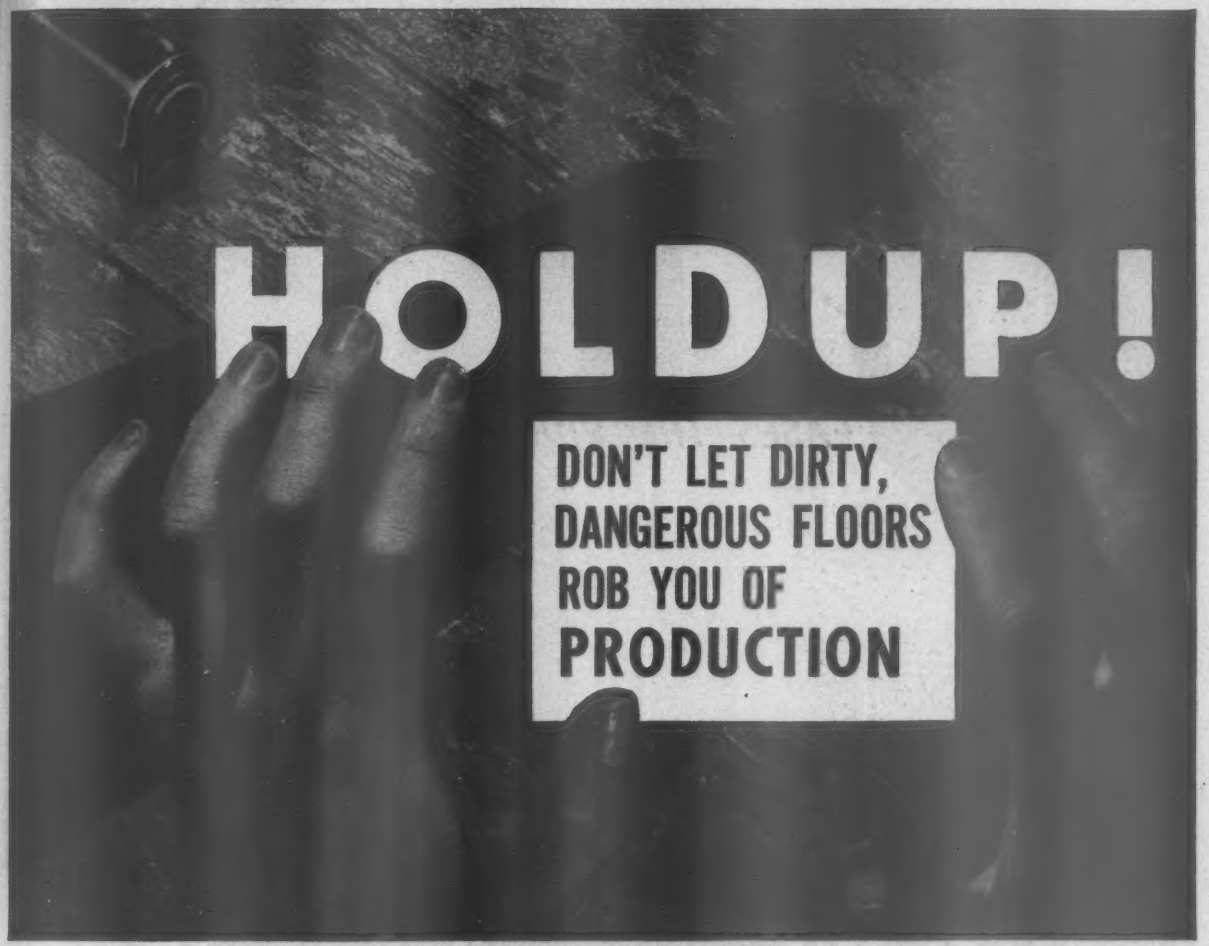
MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope, Super-7, Vari-Pitch, Texsteel, and Magic-Grip are Allis-Chalmers trademarks.

ALLIS-CHALMERS



"Police" them with the "MYCO" Method of Floor Maintenance!

Beware of improperly-maintained floors! They are the avowed enemy of smooth plant operations. Every day they commit wholesale robbery in thousands of factories.

Armed with accidents, sickness, working handicaps and inefficiency — they hijack your help — hamper production — and drain off precious profit dollars.

But there's one certain way to stop this profit robbery and safeguard your plant production.

THE "MYCO" METHOD SAVES MONEY — OFFERS YOU VALUABLE BENEFITS

Improved Plant Efficiency And Lower Floor Maintenance Costs

The result of cleaner, safer, longer-wearing floors — floors maintained with top-quality, time-tested "MYCO" Cleaners, Dressings, Seals and Equipment.

A Complete Floor-Improvement Program — At No Extra Cost

Our trained floor technicians will visit your plant and put the following plan into action:

1. **SCIENTIFIC SURVEYS** of your floors.
2. **RECOMMENDATIONS** for treatment.
3. **PERSONAL INSTRUCTION** of your staff.
4. **PERIODIC INSPECTIONS** and reports.

Factories, businesses, schools and institutions the country over are benefiting from our 94 years of experience. We're ready to serve you promptly.

Send for our Valuable Free Floor-Care Booklet

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M[illegible]O PRODUCTS

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MASURY-YOUNG COMPANY

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LOS ANGELES	440 Seaton St.	MINNEAPOLIS	253 Plymouth Building
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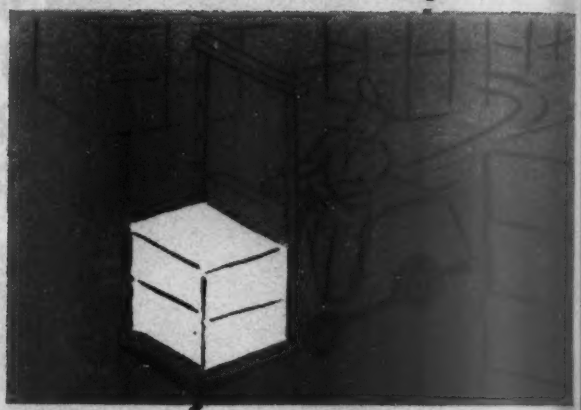
JACKSONVILLE, FLA. P. O. Box 3412

"MYCO means MORE for Your Money — More Value — More Service — More Satisfaction"

Mono-Cushion

EASES THE RIDE



EASES THE LOAD

EASES THE COST

Monarch's tough Mono-Cushion Tires knock your vehicle maintenance costs way down, because they absorb more shock and shock load than any other type of industrial tire, size for size. They reduce floor wear, reduce load breakage, keep drivers happy. To top it off, Mono-Cushions give you low tire costs, too.

The leading manufacturers of industrial vehicles use Mono-Cushions as original equipment. Replacement tires available through the manufacturer of your equipment or his distributors.

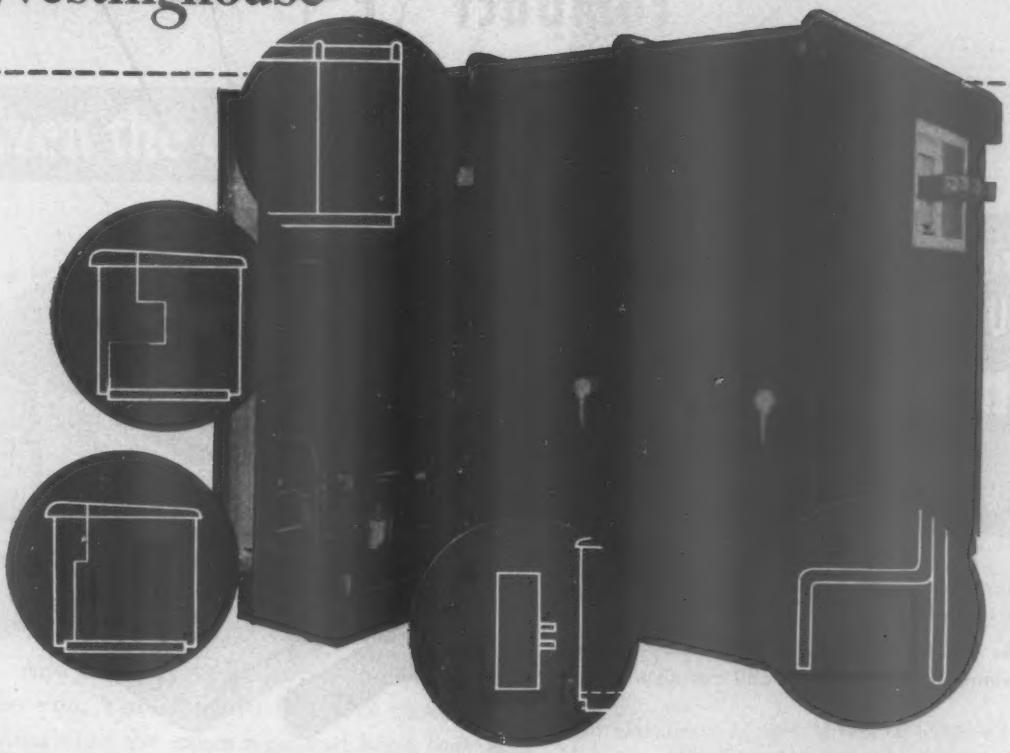
THE MONARCH RUBBER COMPANY

350 LINCOLN PARK • HARTVILLE, OHIO

SPECIALISTS IN INDUSTRIAL SOLID TIRES • MOLDED MECHANICAL RUBBER GOODS

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



Westinghouse Outdoor Switchgear gives you 5 NEW OPERATING ADVANTAGES

Westinghouse brings you redesigned 5-Kv Outdoor Metal-Clad Switchgear with improvements that add up to time and cost savings in installation, operation and maintenance.

Greater accessibility of operating parts . . . better ventilation and weatherproofing . . . improved appearance are among its advantages that give you more for your switchgear dollar.

1. Control knife switches are in easy-to-reach position.
2. Auxiliary compartments provide better equipment access. More headroom makes inspection and maintenance easier.
3. Enclosure makes possible use of two potheads for two 3-conductor cables without sacrificing the full-length instrument panel. Adequate clearance is afforded behind the panel at the pothead elevation for semi-flush Flexitest cases and average-depth Type W switches.
4. Platform height is adjustable. Transport truck provides adjustability for slight variations in pad level.
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Get complete facts from your nearby Westinghouse representative, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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See "Electrical Proving Ground" . . . the dramatic story of the Westinghouse High Power Laboratory in sound and color motion picture. For details, write Westinghouse Film Division, Box 868, Pittsburgh 30, Pennsylvania. J-60743

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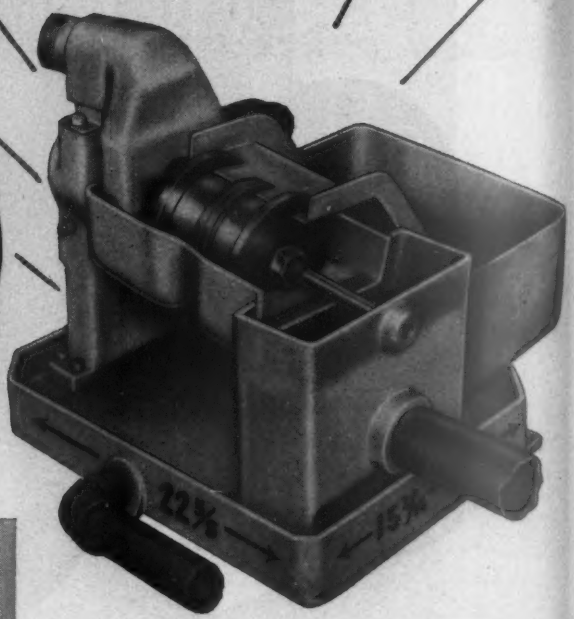

- **Takes up no more space than a drinking fountain . . . yet**
- **Does a king-sized job! Removes 98% of contamination from coolants and cutting oils!**

New Houdaille Magnetic Filter is completely automatic . . . uses no filter bags or cartridges . . . requires no attention. Trouble free! Simple design, rugged mechanism requires no maintenance. Nothing to get out of order.

Ideal for individual machines of all types, such as: grinders, milling machines, gear shapers, drilling machines, etc.

Write for new bulletin describing the compact, powerful new Houdaille Magnetic Filter, TODAY!

Coolant Filtration Cuts Rejects, Reduces Downtime

Liquid coolants used for grinding and cutting operations must be kept free from metallic and abrasive contamination . . . otherwise grinding wheels become loaded and cutting tools are quickly dulled. Excessive rejects and machine downtime are the usual penalties imposed by contaminated coolants. Continuous filtration . . . *before* the coolant flows over the work . . . results in longer tool and wheel life, better finishes, fewer rejects and less downtime. Coolant use is greatly extended and man-hours are saved by eliminating periodic sump cleaning.

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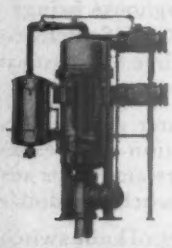
With the addition of the new Houdaille Magnetic Filter Honan-Crane now offers a *complete line* of the finest clarification, purification and handling equipment available for metal working oils and coolants. Write for descriptive literature, stating type of problem involved.

Houdaille "T" Type Clarifier
Cartridge type clarifier connects directly to individual machine tool.

Honan-Crane Purifier
For complete purification through use of cellulose fibre and Cramite (fuller's earth).



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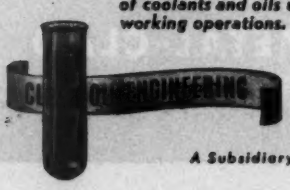
For clarification of oils and coolants in large volume, central systems.

Houdaille Mobile Coolant Filter
Cleans coolant sumps without interrupting production. Easily handled by one man.

Houdaille Sump Cleaner
For sump cleaning and manual transfer of oils to and from clarifier or purifier.



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FACTORY
MANAGEMENT and MAINTENANCE

HOW TO GET A CMP ALLOTMENT

AND OPERATE UNDER THE PROGRAM'S RULES

• • • **In this last-minute report, FACTORY brings you a full summary of rules you have to know to run your manufacturing business if you use steel, copper, or aluminum.**

• • • **We have plowed through thousands of words and scores of pages of small type in new government regulations to extract the meaning. We've boiled it down to make the rules and forms as easy and fast as possible to understand.**

• • • **The new Controlled Materials Plan covering steel, copper, and aluminum takes effect July 1, 1951. But there is a lot of work for industry—and the government—to do before then to get ready. This report tells you what a manufacturer should do—and how to do it.**

MOBILIZATION COMMUNIQUE NO. 10

HOW TO GET A CMP ALLOTMENT

AND OPERATE UNDER THE PROGRAM'S RULES

NOT EVERY MANUFACTURER will get an allotment for steel, copper, or aluminum under the Controlled Materials Plan. But nearly every manufacturer will have to understand *something* about CMP.

You'll need to know, first, whether you should file for an allotment of your requirements of the controlled materials.

Then, if you are among those who must file, you'll have to understand the complex procedure of filing. Your first deadline is May 31—when application forms for the third quarter of 1951 are due.

Even if you don't have to file for an allotment, you may be affected by CMP.

Who has to file?

Not everyone has to apply for an allotment of controlled materials. Many manufacturers will have to keep on getting steel, copper, and aluminum in the open market—as best they can. And not everyone who files will get an allotment.

CMP has set up three classes of people who file. There is a set of rules for each class which determines *whether* you have to file and *how* you have to file. (You may qualify under more than one of these classes, so study them all.) Here are the rules for each of the three classes by which you tell whether or not you file for an allotment of steel, copper, and aluminum:

1. If you make a Class A product (in general, these are products built on special order)—

(a) You file if a claimant agency of the government requests you to apply for an authorized production schedule and allotment. Fill in Form CMP-4A and send it to the claimant agency.

(b) You file if one of your customers who files—as a producer of either Class A or Class B products—requests you to apply for an authorized schedule and allotment. Use Form CMP-4A. Send it to your customer.

(c) You don't file unless you qualify under points (a) or (b) above.

2. If you make a Class B product (you have to consult the "CMP-4B Product Class Reference Manual" to see whether yours is a Class B item)—

(a) You file if the name of the product you make is *not* preceded by an asterisk (*) in the manual. Use Form CMP-4B to request an authorized production schedule and allotment. Send the form to the industry division of NPA listed in the manual for your product. Then you wait and see. There's a good chance you'll get your allotment. But the fact that you are required to file is no guarantee. After getting the applications, NPA may decide it has bitten off more than it can chew, and it may remove some of the items from the "active" B list. But you'll have to go right on filing every quarter just in case NPA might decide to bring you back in.

(b) You don't file if there is an asterisk in front of the name of your product on the "B" list. One possible exception: NPA has the right to ask any particular B product maker to file. So if bottlenecks develop on certain B products you might find yourself under CMP after all.

[At the top of page W-11 of this report is a list of "general classes of products for which CMP

application forms are required." This will give you a pretty good idea of whether the things you make are on the "active" list of Class B products. But it isn't intended to be the final word. Some subdivisions of these product classes aren't on the "active" list. You'll have to check the "CMP-4B Product Class Reference Manual."]

3. If you need controlled materials for use in construction—

You may file an application for an allotment on Form CMP-4C. (Note that filing is optional, not required; with "B" product makers, it's required.) Then you just sit back and wait and see if you get your allotment. If the construction is for a military facility or a plant certified as necessary to defense, you'll probably get your allotment. But again there's no guarantee.

How does an "A" product maker file for CMP?

We oversimplied above when we said: "Fill in CMP-4A, and send it to your claimant agency." Actually that's only the last step of a five-step process that will call for a lot of careful planning and plenty of paperwork.

Here are the five steps in the usual procedure:

1. On the basis of the order or contract you have with the claimant agency, set up your own production schedules on a month-by-month basis, starting with July, 1951, and running right through to completion of the contract.

2. Line up your subcontractors so that their production schedules dovetail with yours. That is, so that you get the parts or subassemblies you need when you need them—no sooner, no later.

3. Request your direct subcontractors to send you CMP-4A's. (If your subcontractor has a subcontractor, he must get CMP-4A's from his subcontractors).

4. Determine your own requirements for controlled materials for your production schedule on a month-by-month basis, starting with July, 1951.

5. Consolidate your requirements with the requirements submitted by all your direct subcontractors (which will include requirements of their subs). Enter the totals on a CMP-4A, and send it to the claimant agency.

Do not include the material requirements of any "B" product that is to be included in your Class A end-product.

Here's an alternative procedure you can use:

1. Line up your schedules.

2. Line up your subcontractors, and their subcontractors, and so on all the way down the line.

3. (*Here is where the procedures differ.*) Have

More on next page

INSTRUCTIONS AND FORMS YOU NEED TO DO BUSINESS UNDER CMP

YOU NEED SEVERAL "TOOLS" to do business under CMP.

All are available from any of the 102 regional and field offices of the U. S. Department of Commerce which serve NPA. In many cases, your Chamber of Commerce will have copies; in any event, your Chamber can tell you the address of your nearest Commerce Dept. field office.

If no field office is handy, you can get copies by writing to National Production Authority, Washington 25, D. C.

HERE'S A LIST OF WHAT YOU NEED:

1. Copies of all CMP regulations • Some are already out; others will be issued shortly. This is the complete list of regulations:

CMP Reg. 1 • Basic Rules of CMP.
CMP Reg. 2 • Inventories of Controlled Materials.
CMP Reg. 3 • CMP Priorities System.
CMP Reg. 4 • Deliveries of Controlled Materials by Distributors.
CMP Reg. 5 • Maintenance, Repair, and Operating Supplies.
CMP Reg. 6 • Construction.
CMP Reg. 7 • Repairmen and Repair Shops.

2. A copy of the "CMP-4B Product Class Reference Manual" • Identifies all "B" products, tells which makers of "B" products are required to file applications and which are not.

3. Copies of all CMP forms and instructions for filling them out • The most important, and the ones you will need *at once* are:

CMP-4A • Application for allotment for makers of "A" products.
CMP-4B • Application for allotment for makers of "B" products.
CMP-4C • Application for allotment of controlled materials to be used in construction.
CMP-5 • This is the "short form of allotment," used for passing on allotments from one manufacturer to another, or to a producer or distributor. *You make your own CMP-5. See sample on page W-14 of this report.*

You'll probably also want copies of these two NPA pamphlets:

"ABC's of CMP" • It's a brief explanation of why NPA thought CMP necessary —and, in very general terms, how it will work.

"CMP Accounting Practices" • That's not yet an official title. The pamphlet will tell your accounting force and purchasing people how to keep internal CMP records.

each subcontractor (no matter how many other subcontractors between you and him) submit his requirements to *you* on CMP-4A's.

4. Determine your own requirements.

5. Consolidate your own requirements with those of all your subcontractors, and enter the totals on a CMP-4A. Send it to the claimant agency.

In this alternative procedure, be sure each subcontractor includes in the CMP-4A he sends you only his requirements and not those of his subcontractors. Do not include B products.

Note to subcontractors: You must file a separate Form CMP-4A for each product you make, and for each customer you sell it to, and for each production schedule if you have more than one schedule for a given customer and product.

Here's a tip that may help simplify your paperwork:

If you make a large variety of "A" products for many customers whose allotments come from several claimant agencies, you can file a request to be treated as a maker of "B" products. Write your request in triplicate. Address: National Production Authority (Washington 25, D. C.)—Ref. CMP Reg. 1, Sec. 24(b).

How does a "B" product maker file for CMP?

If you make a class B product, you file in almost the same way as a producer of "A" items—right up to the last step. Use either the standard or alternative procedure. But on the last step—when you consolidate your requirements with those of your subcontractors—you enter the totals on a copy of Form CMP-4B.

Send the form to the appropriate industry division of NPA.

Remember, you are permitted to include the requirements of subcontractors only to the extent that they need controlled materials to make "A" products to be included in your Class B end-product. Do not include the material requirements of any other "B" product that is to be incorporated in your Class B end-product.

It doesn't say so in the regulation, but there's some small print in the instructions on how to fill out your own CMP-4B that may save you a lot of work:

All products in the "B" reference manual will be listed according to classes. If you are producing more than one "B" product in any given class, you can include your requirements for all such B products on a single CMP-4B. That is, you can combine two or more in a single class provided none is marked with an asterisk. You may *not* combine application for "active" and "inactive" B products.

Can you "anticipate" subcontractor requirements?

CMP regulations do not make specific provision for "anticipating" the needs of subcontractors. But, as a matter of actual practice, you'll have to do it.

You may not have all your subcontractors lined up in advance—especially if you're making an "A" product for the military. So you can't get CMP-4A's coming up the line.

What you do is this: Prepare a complete bill of materials for the product. Determine the requirements for the complete product on the basis of this bill of materials, and state them on a CMP-4A—just as though the entire product were to be made in your own shop. The fact that you will farm out part of the job at a later time should not have any effect on the total of materials needed.

If the actual schedule is changed in any way to accommodate the subcontracts, you'll have to report this to the claimant agency. And if the subcontracting changes the timing of your materials needs (or if the subcontractor has "excess" inventories), you'll have to apply for an adjustment in your allotments—perhaps returning some in one quarter, getting more in another.

When this procedure is followed, it appears to make the CMP-4A's flowing later between subcontractor and prime contractor just so much extra paperwork. Whether that's true or not, you must fill out a CMP-4A to cover every subcontract.

What are your "requirements" under CMP?

You should report on the CMP application forms (CMP-4A-4B-4C) only the quantities of steel, copper, and aluminum that you and those of your subcontractors making "A" products need to complete the production schedule shown on the form.

You must state your needs in terms of each of the various classes of shapes and forms of the controlled materials shown on the form. Then you summarize these needs in terms of the seven major types of controlled materials: (1) carbon steel; (2) alloy steel, except stainless; (3) stainless steel; (4) copper and copper-base alloy products, and brass-mill products; (5) copper-wire mill products; (6) copper and copper-base alloy foundry products and powder; (7) aluminum.

In every case, state the *gross weight* you need. That is, if some product you are making requires 10,000 steel blanks 2 inches in diameter, you do not report the weight of the 10,000 blanks. You report the weight of the steel strip you will have to punch in order to get 10,000 *good* blanks. Stated

another way, be sure to allow for machining scrap and rejections in figuring the quantities you report on your CMP forms.

However, you must deduct from your stated requirements any inventory you have on hand which is in excess of the limitations set forth in CMP Regulation 2.

Here's an example of how the inventory limitation will work:

Say the inventory limit on a particular item is 45 days' supply. Based on your projected schedules, your supply as of July 1 will last you 90 days. In this case, you would report none of this item required for July, and only half of the "normal" amount for August (scheduled for delivery in the last half of the month). Thus, in effect, you would be running for 45 days out of inventory to pare your inventory down to a 45-day level.

Adjusting your inventories to the limits of Regulation 2 will present some problems during the early stages of CMP. Once you get your inventories in line, the problems will largely evaporate —except for minor readjustments as schedules are revised.

There are five things to keep in mind when stating requirements:

1. If you find you have *overstated* your requirements, you must notify immediately the person to whom you made the overstatement. This holds true whether the overstatement is the result of an error or a change in schedule.

2. If an overstatement is discovered *after* you have received an allotment, you must "return" the unnecessary or excess portion of the allotment by filling out form CMP-12 (instructions on this form will come out later).

3. If you find you *understated* your requirements, file at once for a supplemental allotment. Use the same kind of form you used originally.

4. Unlike the CMP of World War II, the present CMP does not require anyone to file a "bill of materials" *unless specifically requested to do so by a claimant agency (and its prime contractor) or an NPA industry division.*

5. Do not prepare statements of your requirements of materials *other than controlled materials* unless you are specifically requested to do so.

How do you reject an authorized schedule?

If a claimant agency or prime contractor comes to you with an authorized schedule, **there's only one basis on which you can refuse to take it: If you would be unable to meet the delivery dates specified**—because the schedule exceeds your capacity, or because it would make it impossible for you to meet deliveries for the authorized CMP schedules which you have previously accepted.

Under those conditions, you not only *may* refuse the schedule, you *must* refuse it.

If you're in the position of trying to place a schedule with a subcontractor and it is refused, here's what you should do: Report the fact to the claimant agency or industry division that authorized it for you. If necessary, NPA may issue a directive requiring a manufacturer to accept the schedule.

How are allotments issued and passed along?

The claimant agency or industry division that authorizes your production schedule—whether for "A" or "B" products—will give you a "related allotment" at the same time that you get notification that the schedule is official.

The allotment will give you exactly the amount of controlled materials you will need to meet your authorized schedule in the next quarter. If your proposed schedule—reported on Form CMP-4A or CMP-4B—is authorized in full, then your allotment will be for the amounts of the seven major types of controlled materials you reported on the form: (1) carbon steel; (2) alloy steel, except stainless; (3) stainless steel; (4) copper and copper-base products, and brass-mill products; (5) copper-wire mill products; (6) copper and copper-base alloy foundry products and powder; (7) aluminum.

The allotment you get will not be broken down into the various shapes and forms within each of the seven types. However, when you use your allotment to get controlled materials from the mill or from a distributor, you can use it only to get the specific amounts of the specific shapes and forms you stated as requirements for a specific schedule on your CMP-4A or 4B.

If only part of your proposed schedule is authorized, you will get a *pro rata* allotment.

When you pass on allotments to subcontractors, use a "short form of allotment," CMP-5. You make up your own Form CMP-5. The general form to use is shown on page W-14 of this report.

If the subcontractor to whom you pass along an allotment has still other subcontractors, include in your allotment to the "nearest" subcontractor the total requirements he reported to you on his CMP-4A. This will permit him to pass along allotments to the "more remote" subcontractors.

But if you used the "alternate" procedure for accumulating requirements and had all subcontractors submit CMP-4A's to you directly, you distribute the allotments to each directly on CMP-5's.

There's one possible short-cut that some prime contractors can use to good advantage: If you have several authorized production schedules bearing

the same allotment number, you can authorize a single production schedule for a subcontractor. That way, your record keeping will be simplified, and you'll only have to pass along one CMP-5 per quarter instead of several.

How are allotments identified?

Allotments will be identified by a three-part symbol: (1) a single letter to designate the claimant agency; (2) a single digit to designate the particular "program" of that claimant agency; and (3) an abbreviation of the calendar quarter for which the allotment is valid.

For example, an allotment for the third quarter of 1951 might be identified K-2-3Q51.

In cases where a claimant agency is not involved, a "combination" letter symbol will be used to indicate the industry division of NPA which has authorized the related production schedule. In the case of maintenance, repair, and operating supplies, the symbol MRO will be used.

How do you get an allotment when producing for a distributor?

If you're making Class B products, this is no problem. Follow the regular procedure for makers of Class B products.

If you're making a Class A product for resale through a distributor—either directly or indirectly—you file for an allotment on form CMP-4B, just as though you were making "B" products.

The wording of Sec. 15(a) in CMP Regulation 1 is hazy on this point. It says you "*may* obtain an allotment" by filing in this way. Don't make the mistake of interpreting this to mean that you *will* obtain an allotment. Maybe you will and maybe you won't.

Keep in mind that the distributor doesn't get involved in allotments. He doesn't give you an allotment when you deliver a Class A product to him. And you don't have to give him an allotment when you buy a Class A product from him.

But—and it's an important *but*—what if you get a Class A product from a distributor to use in an "A" or "B" product for which you got an allotment? Then you must deduct from your allotment balance the gross weight of controlled materials you would have had to use if you had manufactured the product in your own shop. You also have to follow this procedure if you purchase "A" products (up to 10% of your total sales) for direct resale in order to round out your line.

How do you place an order for controlled materials?

Under CMP, you make out a delivery order in just the same fashion as you always have—but be sure to show the related allotment number and the calendar quarter for which the allotment is valid. Then attach a CMP-5 covering the amounts of the types of controlled materials ordered. That applies whether you order from a controlled materials producer (a mill) or from a distributor.

You will have to place your orders in such a way as to comply with the "lead times" and minimum mill quantities specified in Schedules III and IV of Regulation 1. (See pages W-12 and W-13 of this special report.)

Here's how the "lead time" arrangement will work:

1. A producer is *not required to accept* a CMP delivery order which calls for delivery in less than the specified lead time unless: (a) he has open capacity, beyond both DO and non-DO orders scheduled for delivery within the lead time; or (b) he is specifically directed by a Controlled Materials Division of NPA to accept it.
2. A producer *must accept* a CMP delivery order which calls for delivery after the expiration of the lead time but *before* Oct. 1, 1951, unless he already has on his books CMP orders and DO orders up to the percentage of his capacity specified in applicable NPA "M" orders.
3. A producer *must accept* a CMP delivery order which calls for delivery after the expiration of the lead time and *after* Oct. 1, 1951, unless he already has on his books CMP orders up to the percentage of his capacity specified in the applicable NPA "M" orders.

It boils down to this: Most mill schedules for the third quarter are so tight that you won't stand much chance of getting in even a CMP delivery order unless you already have the materials scheduled to come to you on a DO-rated order—or on a nonpriority order.

If you already have on order the controlled materials for your third and fourth quarter schedules which are later authorized under CMP, you can convert those orders (whether DO-rated or not) into "authorized controlled materials orders." You write to the supplier, identify the order, and tell him it has been "Certified under CMP Regulation 1." An allotment on CMP-5 must accompany the certification.

Don't get worried if the mills refuse CMP orders because they are already booked up to the maximum percentage of production required. If you can't place an authorized order because of such turndowns, report it to your claimant agency or to the NPA industry division that OK'd the schedule.

Chances are that the Controlled Materials Division will issue a directive to some producer to fill your order. And if this happens too many times, you can be pretty sure that the producers will be ordered to increase the percentage of their capacity devoted to rated orders (under NPA's "M" orders).

Here's how the rules on minimum mill quantities work:

1. If your requirements of any of the shapes and forms listed in Schedule IV (page W-12 and W-13 of this report) are less than the amounts shown, you should first try to get your supplies through a distributor.

2. If you can't get the materials from a distributor, see if the mill will accept your authorized order for less than the minimum quantity. The regulation doesn't say the mill must refuse an order for a smaller amount—it says it *may* refuse, as long as it doesn't discriminate between one customer and another in doing so.

3. If you're still out of luck, you can go ahead and order the minimum mill quantity. The order for the entire amount becomes an "authorized order," but you must be sure to specify on the order just how much of it is for authorized schedules and how much is not. This is the *only* case where you can combine CMP orders and non-CMP orders; and the combination of the two may not exceed the minimum mill quantity. However, if you have two or more authorized schedules *bearing the same allotment number,* and requiring the the same types of material, then you can and should combine them to bring your order up to minimum mill quantity.

There are two more points to keep in mind when ordering controlled materials under CMP:

1. If your allotment is cancelled or reduced after you have placed an order, you must cancel or reduce the order accordingly—*at once.* If this happens after it is too late to stop delivery, you may accept the materials and dispose of them "subject to other orders or regulations of NPA."

2. You can place your order with any controlled materials producer (mill) or distributor unless the original allotment from the claimant agency or NPA industry division specifically directed the prime contractor to place the orders with certain specific producers or distributors. No "prime" can require a "sub" to place an order with a particular supplier unless the "prime" is *directed* to do so.

Can you get an adjustment or exception under CMP?

The rules say you can get an adjustment if any action under CMP works an "undue or exceptional" hardship upon your company that is "not generally suffered by others in the same trade or industry."

Or you can claim that the national defense or public interest is imperiled. In the latter case, Regulation 1 states clearly: "Consideration will be given to the requirements of public health and safety, civilian defense, and dislocation of labor and resulting unemployment that would impair the defense program."

Submit your application for adjustment in writing (three copies), and give all the details. Address: National Production Authority (Washington 25, D. C.)—Ref. CMP Reg. 1.

How do you maintain inventories under CMP?

Physically, you do not have to make any change in the way you have been maintaining your inventories. It is not necessary to keep inventories of controlled materials received under CMP allotments separate from your other inventories. Nor is it necessary to earmark inventory for a specific production schedule.

In terms of records, you may have to make some changes. You are not required to keep separate records for your various production schedules *if,* and this *if* is so important, you'll need to study the exact language of the regulation: "If the records you normally keep show that your use of material for your respective schedules is substantially proportionate to the amounts of material allotted for each, and that your aggregate production of product does not exceed the aggregate of the production schedules authorized for that product."

What records does CMP require?

In addition to the inventory records mentioned, you'll have to keep the following records:

1. **Allotments received.** Keep the records by allotment numbers. Make a separate entry under each number for each customer (prime contractor or higher subcontractor), claimant agency, or NPA industry division from which you receive an allotment. Show the amount of each allotment.

2. **Allotments passed on to subcontractors.** Keep the records by allotment numbers. Show the name of the subcontractor, and the amount of the allotment you make.

3. **Allotments used** for authorized controlled materials orders. Show the name of the mill or distributor to whom the order was sent, and the amount of the order.

More on next page

4. Receipts of "A" products from distributors. This represents a "charge" against your allotment, even though you do not pass on any allotment to the distributor.

These records must be kept in such a manner as to show a "balance on hand" of controlled materials allotments at any time, by allotment numbers.

You must keep all of your records for at least two years. Be sure to hold original documents.

What limits does CMP place on inventories?

CMP continues the limitation of "practicable minimum working inventory" established in NPA Regulation 1 (see FACTORY, November, 1950, page 68).

It also sets down specific limitations you must observe if they are *less* than a "practicable minimum working inventory."

For steel, your inventory is limited to a 45-day supply, based on your currently scheduled method and rate of operation. You can take into account both CMP schedules and schedules based on operations that don't come under CMP allotments.

For copper and aluminum, your inventory is limited to a 60-day supply.

There's one major exception: If you order structural steel for use in construction, you must keep it segregated, and you cannot order it for delivery (or accept it) more than 45 days before it is scheduled to be fabricated or put in place.

The general rules of NPA Regulation 1 regarding cancellation, reduction of orders, minimum mill quantities, and maintainance of separate inventories for operating units are carried over into CMP Regulation 2 on inventories.

How will priorities work under CMP?

The present DO system will be continued under CMP. In the few cases where a manufacturer is working on a priority job which does not involve controlled materials, he will get a DO rating just as at present.

Where controlled materials are involved, a DO rating will be assigned with your allotment number. This DO rating can be used to get *production materials* other than steel, copper, and aluminum. When using this DO, be sure to show your allotment number *in addition to* the DO rating. It will give you, in effect, a super priority between July 1 and Sept. 30, 1951.

Here's the preferential system to be used for controlled materials:

1. A *directive* from NPA gets top attention. Orders placed pursuant to directives are filled *when called for* regardless of other schedules or priorities.
2. An "authorized controlled materials order"—one with an allotment number—comes next.
3. A delivery order with a DO rating—*if* it calls for delivery *before* Oct. 1, 1951—gets third call.
4. Delivery orders without DO ratings or with DO's calling for delivery *after* Oct. 1, 1951 (unless converted to "authorized" orders), are "open end" orders. Anyone placing such orders scrambles for controlled materials, gets as much as he can (within inventory limits) any way he can.

Here's the preferential system to be used in getting production materials other than steel, copper, and aluminum:

1. Orders placed in connection with a job being performed under NPA directive are filled *when called for* regardless of other schedules or priorities.
2. Orders with DO rating *and an allotment number*, which call for delivery *before* Oct. 1, 1951, get second priority.
3. Orders with DO rating but *without* allotment number calling for delivery *before* Oct. 1, 1951, will get third preference.
4. *After* Oct. 1, 1951, orders with DO ratings—whether or not they have allotment numbers—will get *equal* treatment as second preference orders, right behind directives.
5. Orders without DO are "open end" orders—you scramble for your production materials, get them as best you can.

What are rules for ordering from distributors?

We have already noted that you do *not* use allotments when ordering *products*—either "A" or "B"—from a distributor.

You *do* use allotments when ordering *controlled materials* from distributors in the shapes and forms listed on Forms CMP-4A and CMP-4B.

These are the rules that cover such orders:

1. Unless otherwise specified, an order to a distributor is for immediate delivery.
2. A distributor *may refuse* any order for deferred delivery. If he accepts it, he is not permitted to set aside or hold material to fill it.
3. If he has the stock on hand or knows that it is in transit to him, a distributor *must accept* orders that are: (a) placed pursuant to an NPA directive; (b) authorized under CMP and carrying an allotment number; (c) carrying a DO rating and calling for delivery before Oct. 1, 1951; (d) within the quantity limitations specified in applicable NPA "M" orders.

4. A distributor *may reject* an order for stock which is not on hand or in transit, but may not discriminate between customers in accepting or rejecting such orders.

How is MRO handled under CMP?

Just as under the World War II CMP, you will write your own allotments for maintenance, repair, and operating supplies that require controlled materials. Where materials other than steel, copper, and aluminum are involved, you will continue to use DO-97, subject to the conditions of NPA Regulation 4.

The allotment number to be used for MRO will be the letters MRO, plus an identification of the calendar quarter in which the supplies are required. For the first quarter of 1952, you would identify your order like this: MRO—1Q52. You must also write on the allotment form, "Certified under CMP Regulation 5."

Detailed limitations on your use of allotments to order maintenance, repair, and operating supplies will be set forth in CMP Regulation 5.

What are the "tricks" in filling out CMP forms?

You're bound to run into some snags in filling out your CMP-4A and CMP-4B forms.

The 4A will be the easier of the two to handle, because your claimant agency will largely establish your production schedule for you.

The problems of handling details on 4A and 4B are almost identical. In the following, references are to 4B. But, with the forms in front of you, you won't have any trouble seeing where the same tips apply in filling out a 4A.

Items 3 and 7. In item 3, give the name of the product class *exactly* as it appears in the CMP-4B Product Class Reference Manual. In item 7, give your own description of the products within the product class which you are covering in the application. Do *not* repeat the name of the product class from item 3.

Item 6. This calls for the name and address of "applicant." Fill it in *only* if the application covers schedules for a particular plant. If the application is for a company which will be producing on the schedules at more than one location enter the words, "Not appropriate."

Section I, "Shipments and orders for this product class." Give the requested information in thousands of dollars. If your sales records do not show the amounts asked for, because they are not broken down by "product classes," give the best estimate you can.

Column (h) of this section asks for "value of total unfilled orders" for the product class. If your records do not show the information in this way, you may leave the column blank. If you do fill it in, you can report as of any convenient date—it does not have to be the date you file the application.

Section II, "Proposed production schedule for this product class." You specify the measure you use in stating your schedule. It is best to use units of output, if the production can be readily measured in units. Some schedules can best be stated in pounds, but this is usually second choice. If units or pounds cannot be used, you may state your proposed schedule in dollars. Base any dollar estimates on current prices. Do not attempt to anticipate any price or cost changes.

You *must* fill in your proposed schedule through September, 1952—that is, through five calendar quarters starting July 1, 1951.

In planning your schedules, you must stay within any limits set by applicable NPA "M" orders—with this important exception: Limitations based on a "percentage of base period" do not apply.

Section III, "Consolidated purchase schedule." This is a statement of when you will need how much. Be sure to reduce your statement of needs by the amount of any "excess" inventory you now have on hand. If you require extra "lead time" for subcontractors or for fabrication of parts and subassemblies, this should be reflected in your statement. Do *not*, however, make allowance for the "mill lead times" shown on pages W-12 and W-13. That will be provided for by making allotments to you in advance of the quarter in which you require actual delivery.

Don't let the heading of column (c) throw you. It's to insure against slippage of carbon copies when you type out your application. It simply means that when you type out the form you transpose the item number in the unlettered column at the far left.

Carbon and alloy steel is to be reported in short tons (2000 pounds); all other materials in pounds. Do *not* report fractions—enter the next higher whole number (i.e. 7¼ tons becomes 8 tons).

Section VII, "Detailed purchase schedule." You fill this out if your requirements for controlled materials (from Section III) are *in excess* of following amounts for any quarter: Carbon steel, 100 tons; alloy steel, 5 tons; stainless steel 500 pounds; copper (total of items 40, 50, and 60), 4000 pounds; and aluminum, 1000 pounds.

If you expect to be over these limits, the smart thing to do is to fill out Section VII before filling out Section III.

It doesn't say so directly, but item 10 in Section III is the same as item 10 in Section VII, *and item 10 is the total of items 11 through 18 in Section VII.* Item 20 is the total of items 21 through 27. The same pattern holds for items 30, 40, 50, 60, and 70. Carry these totals back to Section III.

IMPORTANT CMP DEFINITIONS

Direct quotations from CMP Regulations 1 and 3

1 • **"Person"** means any individual corporation, partnership, association, or other organized group of persons, and includes any agency of the United States or any other government.

2 • **"Claimant agency"** means any government agency or subdivision thereof designated as such.

Note by FACTORY: *The claimant agency is the government body that "claims" a certain amount of metal from the Requirements Committee, and distributes this metal (by allotments) to companies making essential products.*

3 • **"Prime consumer"** means any person who receives an allotment of controlled material from a claimant agency or an industry division.

Note by FACTORY: *A prime consumer is anyone who gets his authority to produce (and the metal needed for this production) direct from a claimant agency or an industry division.*

4 • **"Secondary consumer"** means any person who receives an allotment of controlled material from a person other than a claimant agency or an industry division.

Note by FACTORY: *A secondary consumer is a subcontractor. He gets his authority to produce and his metal from a prime consumer.*

5 • **"Allotment"** means an authorization (1) by the Requirements Committee of the Defense Production Administration, of the amount of controlled materials which a claimant agency may receive and/or allot during a specified period; or (2) by the Requirements Committee of the Defense Production Administration, of the amount of controlled materials which an industry division may allot during a specified period; or (3) by a claimant agency or an industry division, of the amount of controlled materials which may be received and/or allotted by one of its prime consumers during a specified period; or (4) by a prime or secondary consumer, of the amount of controlled materials which may be received and/or allotted by one of its secondary consumers during a specified period.

Note by FACTORY: *An "allotment" is a ticket authorizing the holder to buy a certain amount of controlled material. The allotment guarantees that the metal will be available to complete a particular production schedule and can be used to get metal only for that production schedule.*

6 • **"Class A product"** means any product which is not a Class B product, and which contains any controlled material, fabricated or assembled beyond the forms and shapes specified in Schedule I of Regulation I, other than any controlled material which may be contained in Class B products incorporated in it.

Note by FACTORY: *In general, Class A products are those built on special order. To get controlled material for a Class A product, its production must be authorized by a claimant agency—or else you scramble for it on the open market.*

7 • **"Class B product"** means any product designated as such in the "official CMP Class B product list" issued by NPA, as the same may be revised from time to time.

Note by FACTORY: *You get allocations for B products by going direct to the appropriate NPA industry division. If it is decided your B product is sufficiently essential (the decision will be made later) you'll get an allocation.*

8 • **"Program"** means a statement of the amounts of an item or class of items to be provided in specified periods of time.

Note by FACTORY: *The "program" is what the claimant or industry division proposes to the Requirements Committee in asking for allocations.*

9 • **"Authorized program"** means a program specifically approved by the Requirements Committee of the Defense Production Administration.

Note by FACTORY: *The authorized program for which material is to be used will be identified on the allotment form by a single digit.*

10 • **"Production schedule"** means a statement of the amounts of an item or class of items to be produced by an individual consumer in specified periods of time.

11 • **"Authorized production schedule"** means a production schedule specifically approved by a claimant agency or by an industry division with respect to a prime consumer, or specifically approved by a prime or secondary consumer with respect to a secondary consumer.

Note by FACTORY: *This really means a production schedule for which the necessary amounts of controlled materials have been specifically allotted.*

12 • **"Delivery order"** means any purchase order, contract, shipping, or other instruction calling for delivery of any material or product on a particular date or dates or within specified periods of time, and which does not contemplate that further instructions are to be given.

13 • **"Authorized controlled material order"** means any delivery order for any controlled material . . . (as distinct from a product containing controlled material) which is placed pursuant to an allotment as provided in Section 19 of Regulation I or which is specifically designated to be such an order by any regulation or order of NPA.

Note by FACTORY: *It's really just any order for steel, copper, or aluminum to which you attach your certified allotment.*

14 • **"Production material"** means, with respect to any person, any product (including fabricated parts and sub-assemblies) or any material (excluding controlled materials) which will be physically incorporated into his product, and includes the portion of such material normally consumed or converted into scrap in the course of processing. It also includes:

(1) Containers and packaging materials required to make delivery of the products and materials he produces;

(2) Chemicals used directly in the production of the products and materials he produces; and

(3) Items which he has been in the practice of purchasing for resale to round out his line, if such items do not represent more than 10% of his total sales. It does not include any items purchased by him as manufacturing equipment, or for maintenance, repair, and operating supplies.

GENERAL CLASSES OF PRODUCTS FOR WHICH CMP APPLICATION FORMS WILL BE REQUIRED

NOTE: This list is a general indication of the categories of products for which CMP-4B applications are to be filed. Before filing, however, check your specific products in the "CMP-4B Product Class Reference Manual." Remember: Fact that you have to file is no assurance you'll get an allotment.

Agricultural machinery
Construction and mining machinery
Oil field machinery
Machine tools, metalworking machinery and accessories, including welding and cutting apparatus
Steam engines, steam and hydraulic turbines
Pumps and compressors
Conveyors and conveying equipment
Elevators and escalators
Fans and blowers, industrial
Industrial trucks and tractors
Mechanical power transmission equipment
Heat exchangers, condensers, packaging machines, centrifugals, and separators
Hydraulic jacks and lubricating devices
Motors and generators
Switch gear and electrical control apparatus
Electrical welding apparatus, including electrodes and welding rods
Ships and vessels
Locomotives
Railroad and street cars
Tractors
Tin cans
Fabricated structural steel products
Tanks, boilers, and cylinders
Stamped, pressed metal products
Valves and fittings
Anti-friction bearings
Food products machinery
Textile machinery
Woodworking machinery
Paper-making machinery
Printing and publishing machinery
Special industrial machinery
Aircraft and aircraft parts
Truck trailers
Metal shipping containers
Screw machine products
Industrial furnaces and ovens
Mechanical stokers
Office machines
Scales and balances
Commercial laundry and dry cleaning machinery
Lubrication equipment
Commercial service equipment, except household types
Electrical wiring devices and supplies
Electrical indicating and measuring instruments
Lighting fixtures
Steel springs
Bolts, nuts, rivets, and other industrial fasteners
Transformers
Capacitors
Rectifiers
Induction, dielectric heating units
Electrical accessory equipment for internal combustion engines
Electric lamps, incandescent and fluorescent
Collapsible tubes
Internal combustion engines
Radio, radar, and television equipment, except home type
Radio tubes
Telephone and telegraph communication equipment
Storage batteries
Primary batteries, dry and wet
X-ray and therapeutic apparatus
Motor vehicles, except passenger
Small arms
Small arms ammunition
Partitions, lockers, and shelving
Window and door screens
Restaurant furniture
Paperboard boxes
Fiber cans
Tubes and drums
Cutlery
Edge tools
Hand tools
Files and rasps
Hand saws and blades
Other hardware
Plumbing fixtures
Oil burners
Heating and cooking equipment, except residential
Metal doors and sash, frame, etc.
Sheet metal products such as roofing, culverts, etc., except awnings and radiator enclosures
Aircraft, scientific, and surveying instruments
Mechanical measuring and controlling instruments
Optical instruments and goods
Dental, surgical, and medical instruments and appliances
Photographic equipment
Clocks and watches, etc.

INDUSTRY DIVISIONS IN THE NPA

They will handle applications (Form CMP-4B) and allotments for all producers of so-called "B" products. Appeals and claims should also be directed to the appropriate industry division. The "CMP-4B Product Class Reference Manual" will give you the name of the division responsible for any given product.

Reporting to Facilities and Construction Bureau

Building Materials Division

Reporting to Metals and Minerals Bureau

Iron and Steel Division
Aluminum and Magnesium Division
Copper Division
Tin, Lead, and Zinc Division
Miscellaneous Metals and Minerals Division

Reporting to Chemical, Rubber, and Forest Products Bureau

Chemical Division
Pulp, Paper, and Paper Board Division
Containers and Packaging Division
Lumber and Lumber Products Division
Printing and Publishing Division
Rubber Division

Reporting to Industrial and Agricultural Equipment Bureau

Construction and Mining Machinery Division
Electrical Equipment Division
General Components Division
Motor Vehicle Division
Railroad Equipment Division
Engine and Turbine Division
Agricultural Machinery and Implements Division
General Industrial Equipment Division

Reporting to Textile, Leather, and Specialty Equipment Bureau

Electronics Division
Consumers Durable Goods Division
Service Equipment Division
Ordnance and Shipbuilding Division
Leather and Leather Products Division
Communications Equipment Division
Scientific and Technical Equipment Division
Motion Picture, Photographic Products Division
Textile Division
Salvage and Reclamation Division
Aircraft Division

CMP LEAD TIME AND MINIMUM ORDER QUANTITIES

	NUMBER OF DAYS IN ADVANCE OF FIRST DAY OF MONTH IN WHICH SHIPMENT IS REQUIRED				MINIMUM QUANTITY FOR EACH SIZE AND GRADE OF ANY ITEM FOR MILL SHIPMENT AT ANY ONE TIME TO ANY ONE DESTINATION		
	CARBON[1]	LOW ALLOY[2]	STAINLESS[3]	FULL ALLOY[4]	CARBON and LOW ALLOY	STAINLESS	FULL ALLOY
STEEL					Special grades, shapes, specifications, process, and similar factors must be handled by negotiation		
INGOTS	45	75	75	75	25 NET TONS	FOOTNOTE 5	PRODUCT OF 1 HEAT[6]
BLOOMS BILLETS SLABS	45	75	75	Projectile and shell quality 45 Other 75	Rerolling quality 25 NET TONS Forging quality (billets, blooms, and slabs) PRODUCT OF ONE INGOT		Billets of projectile and shell quality BY NEGOTIATION[7] Other quality 7 in. sq. or less 5 NET TONS[8] Over 7 in. sq. 10 NET TONS[8]
TUBE ROUNDS SHEET BARS	45	75	75	75			
SKELP	45						
WIRE RODS (Hot rolled)	45	75	90	75	5 NET TONS		5 NET TONS
STRUCTURAL SHAPES	45	75[9]	150	90	5 NET TONS		BY NEGOTIATION[7]
STEEL PILING	45						
PLATES				BY NEGOTIATION[7]	BY NEGOTIATION[7]		BY NEGOTIATION[7]
Rolled armor							
Continuous strip mill production	45	75	90	75	10 NET TONS		FOOTNOTE 10
Sheared, universal, or bar mill production					3 NET TONS		
RAILS	45			90	5 NET TONS		BY NEGOTIATION[7]
TRACK ACCESSORIES	45			90	5 NET TONS		
Joint bars							
Tie plates Track spikes	45						
WHEELS (Rolled and forged)	45			90			BY NEGOTIATION[7]
AXLES							BY NEGOTIATION[7]
BARS (Hot rolled)	45	75		75[12]	PRODUCT OF 1 HEAT[6]		BY NEGOTIATION[7]
Projectile and shell quality [11]							
Rounds up to and including 3 in.; squares, hexagons, half rounds, ovals, etc. of approximately equivalent sectional area.	45[13]	75[13]	90	75[13]	5 NET TONS		
Rounds and squares over 3 in. to, but not including, 8 in.					15 NET TONS		
Other, including light shapes (angles, tees, channels, and zees), under 3 in.					5 NET TONS		
Rounds and squares, 3½ in. and smaller.							5 NET TON
Rounds and squares over 3½ in. to, but not including, 8 in.							BY NEGOTIATION[7]
Hexagons and flats.							5 NET TONS
BARS (Cold finished)	75[13]	105[13]	105	105[13]	3 NET TONS		3 NET TONS
BARS (Reinforcing)	45						
BARS (Tool steel)	60[14]			90[14]	500 POUNDS		500 POUNDS
PIPE (Standard)	45		120		Publ carload min		
OIL COUNTRY GOODS	45						BY NEGOTIATION[7]
PIPE (Line)	45						
TUBING							
Seamless, cold drawn							Mechanical tubing 5 NET TONS Pressure tubing BY NEGOTIATION[7]
Up to ¾ in. inclusive (O.D.)	45[15]		120	120	1000 FEET		
Over ¾ in. to 1½ in. inclusive					800 FEET		
Over 1½ in. to 3 in. inclusive					600 FEET		
Over 3 in. to 6 in. inclusive					400 FEET		
Over 6 in.					250 FEET		
Seamless, hot rolled					BY NEGOTIATION[7]		
Welded							
WIRE (Drawn, for fabrication and manufacturing)	45	75	99	FOOTNOTE 16			
Low carbon					1 NET TON		
High carbon (0.40 carbon and higher) 0.0475 in. and heavier					1 NET TON		
Under 0.0475 in. to 0.021 in. inclusive					1000 POUNDS		
Under 0.021 in.					500 POUNDS		
WIRE MERCHANT TRADE PRODUCTS–	45				ASSORTED 5 NET TONS		
Wire nails and staples Wire, barbed and twisted Wire fence, woven Wire bale ties							

	CARBON[1]	LOW ALLOY[2]	STAINLESS[3]	FULL ALLOY[4]	CARBON and LOW ALLOY	STAINLESS	FULL ALLOY
TIN MILL PRODUCTS							
Black plate Tin and terneplate Tin plate, electrolytic	45				Any one gauge 5000 POUNDS		
SHEETS							
Hot rolled	45	75	90	75	5 NET TONS		
Cold rolled	45	75	105	90			
Galvanized All other coated	45	75					BY NEGOTIATION[7]
Enameling	45						
Electrical sheets and strip	FOOT 17						
STRIP							
Hot rolled	45	75	90	75	3 NET TONS		
Cold rolled	45	75	105	90			
STEEL CASTINGS	90[18]	90[18]	90[18]	90[18]			FOOTNOTE 18
COPPER AND COPPER-BASE ALLOYS					Nickel-silver and phosphor bronze 200 POUNDS Other 500 POUNDS		
BRASS MILL COPPER AND COPPER-BASE ALLOY PRODUCTS							
Copper and non-refractory alloys	45						
Refractory alloys	60						
WIRE AND CABE PRODUCTS							
Bare wire and cable Weatherproof wire and cable Magnet wire Building wire	35				Standard package quantities as published by each mill		
Paper and lead cable	60						
Varnished cambric cable	40						
Asbestos cable (Type H-F) Rubber-insulated wire and cable (mold or lead cured)	60						
FOUNDRY COPPER AND COPPER-BASE ALLOY PRODUCTS							
Castings (rough, not machined, assuming patterns are available)							
Small, simple, to fit 12x16-in. flask	7						
Large, intricate, and centrifugal castings	14						
ALUMINUM							
SHEET, PLATE, FOIL	60				1000 POUNDS		
ROD, BAR, ROLLED STRUCTURAL SHAPES, WIRE					300 POUNDS		
EXTRUDED SHAPES AND TUBING					300 POUNDS		
OTHER FORMS					NONE		

1 "Carbon steel (including wrought iron)" means steel customarily so classified.

2 "Low alloy high-strength steel" means only the proprietary grades promoted and sold for this purpose.

3 "Stainless steel" means heat and corrosion resisting steel containing 10% or more of chromium either with or without nickel, molybdenum, or other elements.

4 "Full alloy steel" means any alloy steel not classified as "stainless" or "low alloy high-strength." "Alloy steel" contains any one or more of the following elements in the following amounts:

Manganese (maximum of range in excess of 1.65%), silicon (maximum of range in excess of 0.60%), copper (maximum of range in excess of 0.60%); aluminum, chromium, cobalt, columbium, molybdenum, nickel, tantalum, titanium, tungsten, vanadium, zirconium, or any other alloying elements in any amount specified or known to have been added to obtain a desired alloying effect.

5 No minimum on standard grades and sizes. For unusual grades or sizes the minimum order is to be worked out by negotiation.

6 "1 heat" means one batch of metal made in one furnace.

7 "By negotiation" means negotiation between mill and its customer. If no acceptable arrangements are worked out, NPA should be notified.

8 May be modified because of a mill's ingot size and/or rolling schedules.

9 Applies to special rolled shapes, including angles and channels.

10 Other, whether rolled on continuous strip, sheared; universal or bar mill. (A steel producer need not accept an order unless the total quantity ordered is sufficient to make a heat of steel or unless slabs are available in stock or unless similar material is regularly being produced).

11 Includes all projectile components such as fuses, adapters, and base plugs.

12 Includes bars -- rounds for piercing.

13 If annealed or heat-treated, add an additional 15 days.

14 If cold-finished, add an additional 15 days.

15 If cold-drawn or cold-finished, 60 days; for welded tubing, 75 days.

16 Wire drawn: low carbon, 11%; high carbon, 16%.

17 For electrical sheets and strip, use this table:

Lead time	Definition
Low grade, 45....	AISI M50, M43, M36
Medium grade, 45.	AISI M29, M22, M19
High grade, 60..	AISI M17, M15, M14, and oriented

18 Lead times apply to unmachined castings after approval of patterns for production.

19 2000 pounds or less from any one pattern or mold, or a minimum production run by the producing foundry.

Instructions for Use of Short Form of Allotment—Form CMP-5

CONTROLLED MATERIALS	ALLOTMENT (Specify short tons or pounds) ...Quarter 195....	....Quarter 195....	....Quarter 195....	....Quarter 195....
10 CARBON STEEL (Including wrought iron)				
20 ALLOY STEEL (Except stainless steel)				
30 STAINLESS STEEL				
40 COPPER AND COPPER-BASE ALLOY PRODUCTS; BRASS MILL PRODUCTS				
50 COPPER-WIRE MILL PRODUCTS				
60 COPPER AND COPPER BASE ALLOY FOUNDRY PRODUCTS AND POWDER				
70 ALUMINUM				

ALLOTMENT NO. _____ Signature and Title _____

Above allotments are made for use in filling this delivery order in compliance with CMP Regulation No. 1 Date _____

The short form of allotment may be used by any consumer to make an allotment to a secondary consumer producing Class A products for him. It must be either placed on or physically attached to the delivery order calling for delivery of the Class A products. If it is attached, the delivery order number or other identification must be indicated on the form.

The form must be signed by an authorized official of the consumer making the allotment. But it need not be separately signed if it is placed on the delivery order in such a position that the signature of the delivery order by such an authorized official clearly applies to the allotment as well as to the order itself.

Size of form may be varied. But all information called for by the form must be supplied. Also, the general arrangement and wording of the form must be followed.

MRO PRIORITY ORDER REVISED

The government is limiting the scope of priority help for maintenance, repair, and operating supplies (MRO). The NPA on April 16 banned the use of the DO-97 priority on 10 broad categories of MRO. Reason: NPA's Regulation 4 (the MRO order) brought forth a flood of DO-97 orders that in many cases exceeded the total supply of goods.

There are two important points to remember about the revision:

The ban is retroactive. If you have already applied a DO-97 to any of the materials or products covered by the ban, the priority is automatically canceled. But your order to the supplier is *not* canceled.

The items on which a DO-97 is banned still count in your MRO quota. If you buy them (even though you can't use priority aid) you must charge the amount of the purchase against your MRO quota (explained fully in March, 1951, FACTORY, insert after page 64).

Here is the NPA's list of groups of materials or products on which the use of DO-97 is banned:

1. All basic organic and inorganic chemicals, their intermediates, and derivatives other than compounded end-products not customarily sold as chemicals.

2. Items appearing in List A of NPA order M-47, as it may be amended from time to time. (Latest version, April 4, 1951, lists eight categories of equipment, with several hundred sub-items. The most important to manufacturers are: office, building, professional, and business furniture and fixtures; partitions, shelving, lockers, and fixtures; cooking equipment; floor waxing and polishing machines; air conditioning units under ¾ hp.; utensils and cutlery for plant cafeteria; household-type vacuum cleaners; motor scooters, motorcycles, bicycles; garden and lawn equipment; pens and mechanical pencils; venetian blinds, shades, and awnings.)

3. Nylon fibers and yarns.
4. Packaging materials and containers.
5. Paint, lacquer, and varnish.
6. Paper and paper products.
7. Paperboard and paperboard products.
8. Photographic film.
9. Rails, tie plates, track spikes, splice bars, rail joints, frogs, switches.
10. Rubber tires and tubes.

Don't expect this to be the "last word" on MRO. In its announcement of the April 16 amendment to the regulation, NPA explained that this is an "interim action. . . . Further changes in Regulation 4 are being considered."

Certainly CMP, starting July 1, will require changes in the MRO rules so far as products made of steel, copper, and aluminum are concerned. But few people at NPA seriously expect that the present version of the MRO regulation can stand up even until July 1.

LOOKING AHEAD IN LABOR

Last-minute round-up as we go to press

What you can expect from labor's victory on the Wage Stabilization Board:

► Management pressure on Congress to take disputes away from WSB. (Congress won't.)

► Avoidance of Taft-Hartley 80-day injunction. National emergency disputes will go to WSB instead.

► Labor's use of Truman's mobilization advisory board to short-circuit Wilson on labor policies.

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WSB will not make binding decisions in labor disputes unless requested by both sides. That is important to remember. Disputes certified by Truman will be handled, as on railroads, with "recommendations" to the President.

However, you and the union can ask WSB to consider a dispute without White House action. And you can ask for recommendations, or a binding decision.

NOTES ON STRIKES

Instability brought a sharp rise in strikes after Korea. The trend will continue upward. The number of strikes last year—4843—was exceeded only in 1944 and 1946. The number since Korea has been running double pre-Korea. The big issue continues to be wages.

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Left-wing United Electrical Workers, on strike four months against General Electric's incentive piecework plan, finally yielded—after G. E. announced it would sell the strikebound transformer plant at Oakland, Calif.

•

Strike insurance is available to CIO oil workers. They pay union $1.73 monthly. After six months, the union will pay strikers up to $100 a month benefit. For them to collect, strike must last at least 21 days.

•

Wildcat strikers are in for a rough time from employers, NLRB, and even unions.

Westinghouse shut down its Sharon transformer plant to stop wildcats. NLRB upheld International Shoe's lockout until it got union assurance against wildcats.

At Chrysler's DeSoto plant, UAW-CIO has put four "wildcat instigators" on trial.

BIG ISSUE: THE UNION SHOP

Take notice of the full union shop CIO's rubber workers pressured from Goodyear Tire, under strike threat. It's the beginning of a real union-shop drive in CIO-organized mass production plants.

Union shop pressure will be felt first in rubber, then steel. Auto and electrical unions will go slower. The union-shop drive is one of the big reasons why labor insisted on giving the Wage Stabilization Board some disputes functions.

Up to now, CIO has gone along with a modified union shop in automobile, rubber, steel, and electrical industries—variations of maintenance of membership. New objective is the full union security allowed by Taft-Hartley. That is the union shop.

Here's the difference: Under a full union shop, every employee must be in the union after a brief probationary period. Under a modified plan, all new employees must join, but not existing non-union employees.

Almost all contracts signed since Korea have union security or checkoff protection for unions. Half of them have both. AFL has more union security contracts. CIO relies more on the checkoff. (The figures are taken from a National Industrial Conference Board survey of 247 post-Korea contracts.)

STATUS OF YOUR RESERVISTS

The outlook for keeping reservists in your plant has brightened. Unless the war picture worsens, this is the Defense Department plan:

► The Army and Air Force will not call any more inactive enlisted reservists. Inactive officer reserves will be called only when they have skills not available from organized reserves.

► The Navy is calling inactive reservists only when organized reserve units can't supply the men or the necessary special skills.

► The Marines will call only those inactive reservists with specialties needed to fill specific billets.

► In all service branches, inactive reservists already called to duty involuntarily will be released—beginning this summer.

LOOKING AHEAD IN BUSINESS

Last-minute round-up as we go to press

Mobilization Director Charles E. Wilson outlines a cheering prospect:

- The next 12 months will be the big ones for the defense program. Take of materials will be biggest in late 1951 and early '52.
- Even at the program's peak, there'll be materials for producing autos, appliances, and other "non-essentials" at the 1948 rate.
- By 1953 we should be able to ease economic controls and push production for civilians back toward the 1950 level.

Coming after nine months of growing shortages and mushrooming controls, this outlook holds bright promise for business.

But—is Mr. Wilson too optimistic? Getting over the defense hump by 1953 calls for:

1. Raising efficiency through all industry on both military and civilian production. But with shortages and bottlenecks growing, that will be hard.

2. Finding manpower. If even civilian businesses like laundries can't attract the workers they need, living standards will drop more than the Wilson report suggests.

3. A steadily-rising flow of materials. Such things as strikes, a lag in expanding output of aluminum or other metals, or a drop in imports of critical materials could upset the production program.

These things—productivity, manpower, and materials—come largely under management's control. But two other developments industry can't do much about might upset the timetable:

Inflation, which, as Mr. Wilson says, could undermine the whole defense program; and

New threats from the Kremlin, which would raise the armed services' requirements for weapons. The whole mobilization program is so delicately balanced that a slight raising of military production targets would practically wipe out hopes for continuing output of automobiles, refrigerators, and television.

But when all these "ifs" are in and recorded, the Wilson report is still cheering. It wipes out the fog that has obscured Washington's planning.

•

Don't put much stock in Washington's "relaxation" of some restrictions on metals.

There have been relaxing orders—postponing restrictions on use of aluminum in civilian products, cutting down deliveries of copper to the stockpile. They've come largely under political pressure.

But the room for relaxing is disappearing. As military production begins to roll this summer, the shortages will get worse.

The worst squeeze won't come on steel and copper—the workhorse metals. The relief for copper comes from the fact that steel is being used instead of brass in ammunition.

Defense now takes about 12% of both steel and copper. That will grow to 20% or so by year's end. Defense-supporting programs—industrial expansion, freight cars, and others—may take as much more. But the total bite at the peak of the program may be no more than 40% of the steel, 50% of the copper.

Tungsten is the scarcest metal now. U. S. needs for it—in jet engines, electronics, armor-piercing shells, and high-speed tool steel—may well be bigger than the whole world's supply.

Nickel, molybdenum, cobalt, bismuth—the other rarer metals and alloys made from them—are all coming under tighter control. Even lead, in relatively easy supply a couple of months ago, is being curtailed in its uses. Demand is outrunning supply by 16%.

•

How strong is consumer demand?

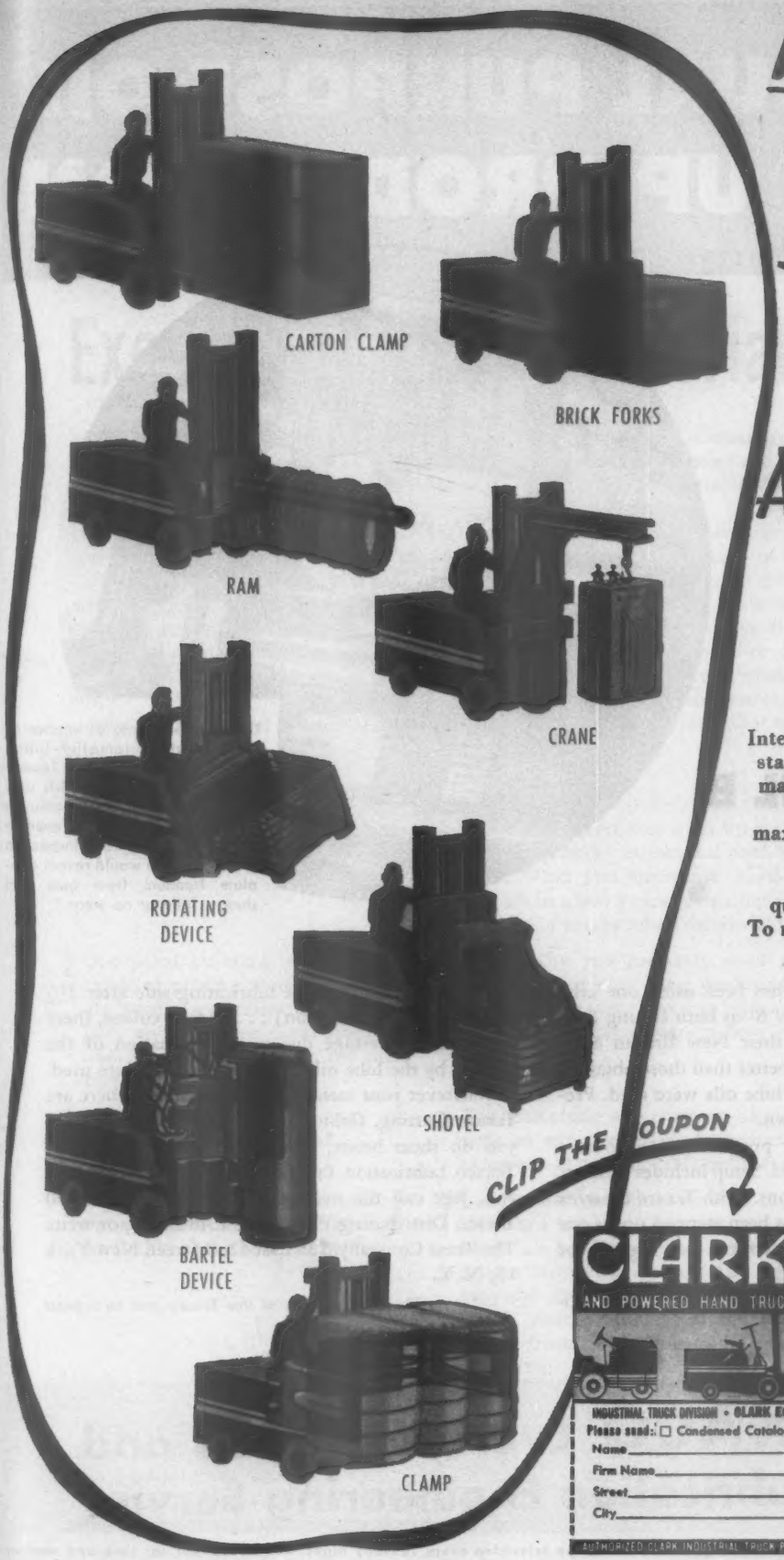
The Federal Reserve Board's answers to this multibillion-dollar question have become a key tool for managements trying to estimate sales potentials. The board makes an annual survey.

This year the results are surprising. They show that "there may be somewhat less urgency in consumer buying in the automobile and major appliance markets."

People want to buy about as many houses this year as last. But they don't intend to rush out and buy durables—particularly autos, new and used. Credit regulations and some over-buying last winter have added to their uncertainties.

In short—even with inflation—many a company has a real selling job ahead.

MORE FOR YOUR MONEY .....IN CLARK Attachments



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Interchangeable in most cases with standard forks, these attachments make a fork-truck *many machines in one*—a truck out of which maximum rather than just normal benefits are derived. And all this at a cost so low that it is quickly and painlessly absorbed. To make the most of your fork-lift trucks—to discover uses for them that might not have occurred to you, check with your CLARK Dealer (he's listed in the Yellow Pages of your telephone book) or fill out the coupon below and send it to us attached to your business letterhead.

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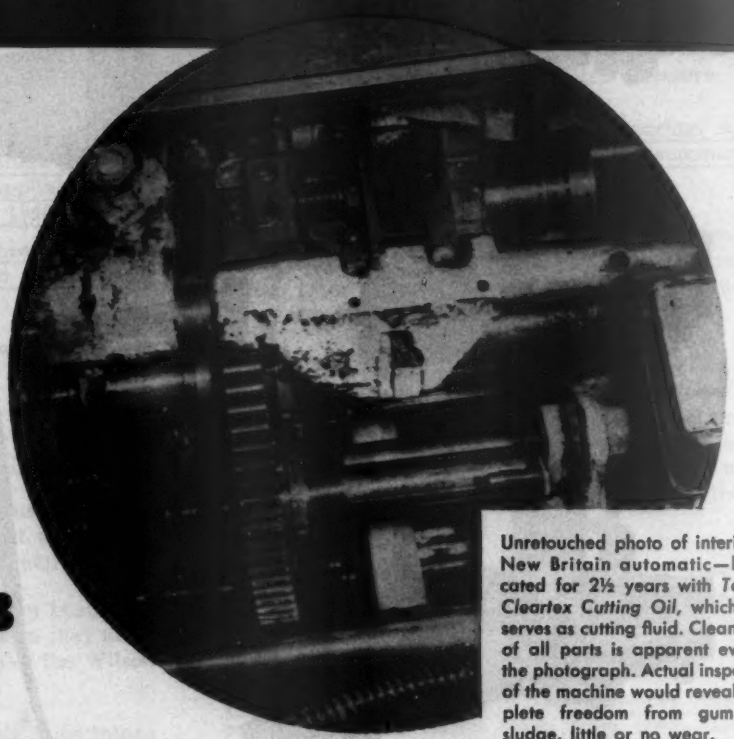
THIS DUAL PURPOSE OIL STEPS UP PRODUCTION

New England manufacturer* also gets longer tool life, cleaner operation with TEXACO CLEARTEX CUTTING OIL B



Unretouched photo of interior of New Britain automatic—lubricated for 2½ years with *Texaco Cleartex Cutting Oil*, which also serves as cutting fluid. Cleanliness of all parts is apparent even in the photograph. Actual inspection of the machine would reveal complete freedom from gum and sludge, little or no wear.

For 2½ years this plant has been using one oil—*Texaco Cleartex Cutting Oil B*—as both cutting fluid and machine lubricant in their New Britain automatics. Results are notably better than those obtained when separate cutting and lube oils were used. Production is up; costs are down.

Machines are in regular production, 16 hours a day, on No. 430 stainless steel. Setup includes drilling, forming and cut-off operations. With *Texaco Cleartex Cutting Oil B*, drill life has been stepped up to one million pieces, and a circular form tool is good for two million pieces.

Another impressive fact is the exceptional cleanliness of the interior of the lubricating side after 2½ years' use (see illustration) . . . and, of course, there has been no wastage due to contamination of the coolant by the lube oil—as when two oils were used.

Whatever your metal cutting operations, there are Texaco Cutting, Grinding and Soluble Oils to help you do them better, faster, and at lower cost. A Texaco Lubrication Engineer will gladly work with you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

**Name of this Texaco user on request*

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

THEY AREN'T REASONS, THEY'RE

Excuses for Poor Materials Handling

AS WE LOOK FOR NEW IDEAS to pass along to you, we editors get into a lot of plants. Little ones and big ones, old ones and new ones. Something that often baffles us is this: *How can some managements be so blind to what they could save in costs by better materials handling?*

Not that we find many plants today without *some* mechanical handling equipment. We don't. But we find plenty of plants that could do a far better job than they are doing. And we know that they know it. Then why don't they do as well as they know how?

As often as we find it diplomatic to do so, we ask why. Sometimes we get real reasons. But mostly what we hear are excuses. The excuses run to a definite pattern. And they nearly always add up to inertia.

Just to check on our own experience, we asked the sales staff of a large handling-equipment manufacturer to give us their impressions of why some plants do a poor handling job—when it is perfectly obvious that they could improve. What are the reasons or excuses that they get as salesmen? We've studied their answers and they boil down to the same excuses we hear. Here they are—with the facts that usually fit the case:

THE EXCUSE	THE FACTS
1 We don't have the money to invest. The financial people don't understand the need.	1 You're actually paying for the equipment in excessive labor costs. And when you wind up a year, you have nothing to show for this excess—except the need to spend the same amount next year. What you spend for good materials handling will save enough in a few years (or sooner) to pay for itself, and then your savings in excess labor costs will be free and clear.
2 Our plant building is too old to think of putting modern materials handling equipment into it. It isn't one of these nice, spacious one-floor places I see in the pictures.	2 That's why you probably need good materials handling more than anybody else. Your workers have a tough time getting stuff around the plant. You can make the job a lot easier and save plenty. How about floor-to-floor conveyors, chutes, light trucks?
3 We're making money now, so why change our methods?	3 Yes, and along will come an alert competitor—or somebody else with an entirely different product that will do what yours does cheaper—and whammo! you'll wonder what hit you.
4 No need for us to spend money for equipment. Materials handling isn't a big part of our costs.	4 That's what you think. Some of the costs are obvious, but most of them are hidden. You may not have a single man assigned to materials handling, but handling may be 25% or more of your production costs. Analyze the time studies on your production jobs and you'll see. If you can't do this, make a survey yourself. Check your prejudices at the factory door some morning and have a fresh look at how much handling your production workers are doing.

Now, we don't mean to say that there is *never* a reason to postpone an exenditure for good materials handling equipment.

And we know that some plants have jumped into materials handling expenditures that didn't pay off —because the engineering was poor. But in nearly every case where there are obvious improvements that could be made, the plant management's explanation is not a reason but an excuse.

SAVING CRITICAL MATERIALS is the goal of workers in this RCA Victor television assembly department.

A READY-MADE SAVE-MATERIALS PLAN YOU CAN USE:

RCA's New Triple-S

It's a swell campaign. It's timely—hits at today's biggest problem: *how to stretch scarce materials.*

Best of all, it's ready-made to use in any plant, practically anywhere.

RCA Victor will help you get a Triple-S campaign rolling in your plant, too.

The company will be glad to give you more information on the campaign and the materials used in it, including sources. **See page 73.**

Posters are part of the company's big new conservation drive, now running in all RCA Victor plants.

Campaign

Does it work? Sure does. For example:

- **17,000 slogans in 9 days from slogan contest.**
- **Suggestions average three times normal.**
- **Interest highest since World War II days.**

BACK IN THE DEFENSE PROGRAM DAYS of 1941, RCA Victor started its trail-blazing "Beat the Promise" campaign. The aim was to boost morale to meet—and beat—the tremendous production job then needed. (See FACTORY, March, 1942, "Beat the Promise" insert.)

Now, 10 years later, the same company has launched another major morale-building campaign to meet the needs of another national defense program. The theme is conservation; the symbol is "Triple-S":

Save Material — Save Jobs — Serve Your Country.

The theme is different than it was 10 years ago. But the basic aim is really the same: *to give every employee the chance to make a positive personal contribution to the defense program.*

Employees now on war production have a sense of urgency about their work, RCA Victor reasons. But those who aren't on war work have had little sense of "belonging." There's nothing definite they can do to help the defense program.

That's where the Triple-S campaign's "psychological lift" comes in. Conserving critical materials is something *every* employee can do.

Why the drive is important

The drive is important, says RCA Victor, because scarcity of critical materials—cobalt, copper, nickel, steel, aluminum, brass, and tin—is today's biggest problem. In a partial mobilization we have to support two economies—war and civilian.

There aren't enough critical materials for both. War production gets first choice. What's left is all there is for the civilian economy.

"Industry," says J. M. Toney, RCA Victor's director of public relations, "can't expect to do this dual job by yelling for help from Washington. It must help itself by stretching available critical materials. Unless industry does its full part, it can't rightfully expect government to help when the pinch comes. That's the reason for the Triple-S. It applies to *everyone* in civilian production—with selfish as well as patriotic implications."

How Triple-S idea was born

When our troops moved into action in Korea, RCA Victor's engineers moved into action, too. Their aim was to design out of the company's products all the critical materials they could, without cutting down on quality.

Changes made in RCA loudspeakers are typical of the results. Cobalt content was down by 70%, brass by 90%, steel by 35%. These changes, plus redesign of television picture tubes, reduce the cobalt content of the average receiver by 90%.

But it soon became clear that only half the battle was being won. The rest of the job was to get conservation rolling on the factory floor. That meant getting every employee, from top down, stirred up as never before about conservation. It meant an all-out drive to inform and "sell."

The result was the Triple-S campaign.

To see how RCA Victor runs its Triple-S campaign turn the page.

RCA'S NEW TRIPLE-S CAMPAIGN

Begins on page 68

HOW RCA VICTOR RUNS ITS TRIPLE-S CAMPAIGN

Planning meeting like this set stage for big drive.

THE PLANNING • Planning was a group job. It was spearheaded by the public relations department, working closely with the personnel, advertising, and manufacturing departments.

The planners settled basic policy matters first—theme, duration of drive, contests and prizes, and budgetary arrangements. They also set up general plans for posters, contest coordination. publicity, and promotion. But they stopped short of step-by-step instructions. They wanted the individual plants to work out as many operating details as possible. That way, they felt they would get the maximum of local interest and participation. As a result, the plan has these built-in "local flavor" features:

1. Each plant has its own Triple-S drive chairman. He's known as "Mr. Conservation," or "Mr. C." It's his job to keep on top of everything, and to work closely with local groups.

2. To help the "Mr. C's," plants make liberal use of committees representing shop and office employees and management. This builds up a lot of good ideas, and also "sells" the program in the plant. These are the usual committees:

Policy committee: Plans and directs over-all program, prepares and approves budgets.

Publicity committee: Works up material for posters, bulletin boards, public address announcements, billboards, and *Family News* (employee magazine). Committee also makes local newspaper contacts.

Poster committee: Develops local posters, and other visual material. Handles actual posting of all items.

Suggestion committee: Plans and promotes suggestion system during campaign. Helps investigate Triple-S suggestions.

Slogan committee: Directs promotion of slogan contest; collects, files, and records entries; arranges for judging.

Special events committee: Plans and directs all special events.

3. Preliminary meetings of plant managers and key people (Mr. C's) were an important method of building up local flavor, too. Meetings showed just how general aids worked out centrally would be supplemented by local action. The interchange of ideas for local promotion at these meetings also helped.

1 TEASER CAMPAIGN • On March 8, one week before the formal kick-off of the drive, all RCA Victor plants started "teaser" campaigns. To arouse interest in what was coming, plants were plastered with posters and streamers carrying the Triple-S theme, but not explaining it. Prominent among the promotional devices used was a streamer showing

2 THE KICK-OFF • The big date—March 15—was a day of great fanfare in every RCA Victor plant. Employees reporting for work were met on every side by posters satisfying the curiosity that the teaser campaign had aroused. Public address announcements supplemented the posters. The plants held rallies—each different—at which employee and management representatives told about the program, and

3 THE SUGGESTION PROGRAM • Employee suggestions are always important at RCA Victor, where a suggestion program has been in operation for a good many years. Now, with the Triple-S campaign in full swing, suggestions have taken on an added significance. Here's what the company is doing to stimulate more of them:

1. Existing suggestion system pol-

an evil character called "Job Robber," later identified as "waste."

The RCA Victor people feel teaser campaigns are excellent stage-setters for important drives. But they warn that you can't use the method too often. There's a danger that it will get cut-and-dried, and lose its ability to arouse curiosity and stimulate interest.

stressed the importance of the campaign to the employees.

News releases to local papers and radio stations added to the impact by bringing the story to families and friends of employees. Special events and "stunts" played their part, too. One plant brought in a brass band. Another launched big weather balloons bearing the Triple-S theme to signal the campaign's start.

All featured the villainous "Job Robber" in various ways, supplementing the 40-in.-high cut-out figures the company provided. Some had live Job Robbers cavorting about.

All employees received copies of the "Triple-S Campaigner," an expertly edited 4-page flyer. It looked a lot like the regular employee magazine, and told the full story of the drive. There were several messages from top executives, plus feature articles, photographs, and a full page of explanations of the slogan contest rules and prizes.

Too much? "Not on your life," says the company. "You *can't* do too much to get an important drive like this off to a good start. You *must* make that first impression go over with a bang, or your whole program will just limp along."

icy has been broadened. The emphasis normally is on cost savings. But this is now changed, to encourage save-material suggestions, regardless of cost. The company is realistic about this. It says:

"Emphasis may shift from cost savings to practicality. Even more expensive methods may be used, if they will help maintain production threatened by curtailment."

The only limitation is that suggestions must *not* reduce quality to save materials.

2. Suggestion blanks have been reprinted with a different colored ink, so they will stand out as "special" during the drive.

3. A big black-and-yellow sticker is pasted on every suggestion that contains a material-saving idea. The sticker reads: "Please expedite. This suggestion is to save material."

4. Special 3-color posters tie the suggestion program in with the Triple-S theme. A small size on cardboard just fits the bulletin boards on all suggestion boxes. A much larger version of the same poster is used for general plant posting. Payroll stuffers (bogus money) are also used.

More on next page

4 **THE SLOGAN CONTEST** · The slogan contest started on kick-off day, and lasted just nine days. Its aim was to provide another means of arousing initial interest and participation in the drive. It did just that, since it brought in approximately 17,000 entries—about 2000 a day, including Sunday.

The winning slogan, announced April 23, is "We have the most to save. Let's save the most."

Winner Theodore J. Miley, of the Lancaster, Pa., tube plant, got a 17-in. television-radio-phonograph combination with an RCA factory service contract, and $50 worth of records. He could have taken six $100 Defense Bonds instead.

In addition to this grand prize, 55 $50 Defense Bonds were handed out to plant winners, pro-rated among plants in proportion to size.

Judging committees in each plant were composed of representatives of employees and management, plus prominent personages in the local communities. The grand prize-winner was picked in Camden from among the 55 local winners.

5 **THE CONSERVATION CONTEST** · On May 31, each plant will pick a "Triple-S Champion"—the person who has done the most to help make the drive a success.

The various champions will get an all-expenses-paid trip to Camden headquarters. They will, of course, be wined and dined and feted. But just what else will happen to them —except that it will be "good"—isn't yet known. The company is keeping the details secret, as a surprise to the winners when they have been picked.

6 **PUBLICITY AND PROMOTIONAL** · Under committee control, out-of-plant publicity is largely confined to releases to newspapers and radio stations. But in-plant activities are free-wheeling and fast-moving.

Heavy coverage of the drive in the employee magazine is, of course, standard. So, too, is liberal use of the public address system. It's on the ideas for special promotions that plant committees let their inhibitions go.

Promotions generally fall into two classes: interest-arousing "stunts," and events involving prizes or rewards. Often the two are combined, as at a noon-hour variety show, with local talent, where drawings for merchandise prizes will also be held.

The ideas that are described above are just a small sample of the kinds of things that the plants are trying. Many more can be—and are—dreamed up to suit local plant conditions.

How to run a successful Triple-S Campaign

Here are 12 hints, drawn from RCA's World War II experience, that will help you to run your own employee campaign—

1. Take the profit motive out. Don't risk having employees hold back because they think your aim is selfish.

2. Take the first step yourself. Set the stage by engineering critical materials out of the product.

3. Have something definite for all to *do*. Talk's cheap. *Action* counts.

4. Make it short and sweet. Six to eight weeks is good. If you want more, make a new start.

5. Be timely. You *must* have a tie-in with something big and important that's currently hot.

6. Change face and pace. Variety gives a campaign its spice, keeps interest high.

7. Pick a "spark plug." One person—well liked and able to get things done—is needed.

8. Keep the flavor local. Get everybody's ideas and help. Orders from topside won't do.

9. Give lots of recognition. It helps get everybody in the act.

10. Keep 'em informed. Results talk, so broadcast them. News of what's coming is important, too.

11. Keep enthusiastic. This means *you*. If you're not stirred up, nobody's going to be.

12. Above all—BE SINCERE. Workers soon see through a campaign that is a "painful duty," or a publicity stunt.

Don't forget: You need enthusiastic cooperation to make any employee campaign work. To get it, you have to *sell* your ideas.

What a Triple-S Campaign would cost you

The direct cost of the campaign has been nominal, RCA Victor reports. Actually, biggest out-of-pocket expenses have been for posters, printing, and contest prizes. No additions to staff have been needed, since all people involved have regular full-time jobs. They take time off as required to keep the program rolling.

In fact, the rise in regular cost-reducing suggestions that has accompanied the drive might pay for the whole thing.

What you may expect from a Triple-S Campaign

The Triple-S Campaign at RCA Victor is going on right now. It won't be over until May 31. So the results aren't all in by any means. But here's what can be reported so far. It will give you a rough idea of what you might expect to get from a similar drive.

About 17,000 slogans were turned in during the nine days the slogan contest lasted—almost 2000 a day. Based on World War II statistics, RCA Victor people told FACTORY's editors before the contest started that 12,000 to 14,000 responses would be exceptional. The actual result has E. G. Bowman —"Mr. Conservation" for the whole drive—muttering Hollywood words like "supercolossal".

The suggestion program shows the same type of heavy response as the slogan contest. Volume of suggestions is running three times normal, and one of the smaller plants reports nearly 25% participation by employees in the first three weeks.

It's too early yet to report figures on accepted suggestions. But the general impression is that the quality is good, and the ideas are practical.

A FACTORY tour of manufacturing operations revealed direct day-by-day conservation effort that's impressive: numerous boxes of hardware that employees are no longer "too busy" to salvage; piles of components and sub-assemblies that can be salvaged or repaired; cartons of copper scrap, even including ¼-in. and ½-in. clippings from ends of wires.

One foreman sums up what's happening in his department this way:

"Don't quote me now. But if my gang keeps piling this stuff up, we'll be able to run these lines the whole month of June without ordering a damned thing on the critical list."

This is obviously an exaggeration, the company reports. But it's an indication of the high level of enthusiasm that has been generated among employees by the campaign.

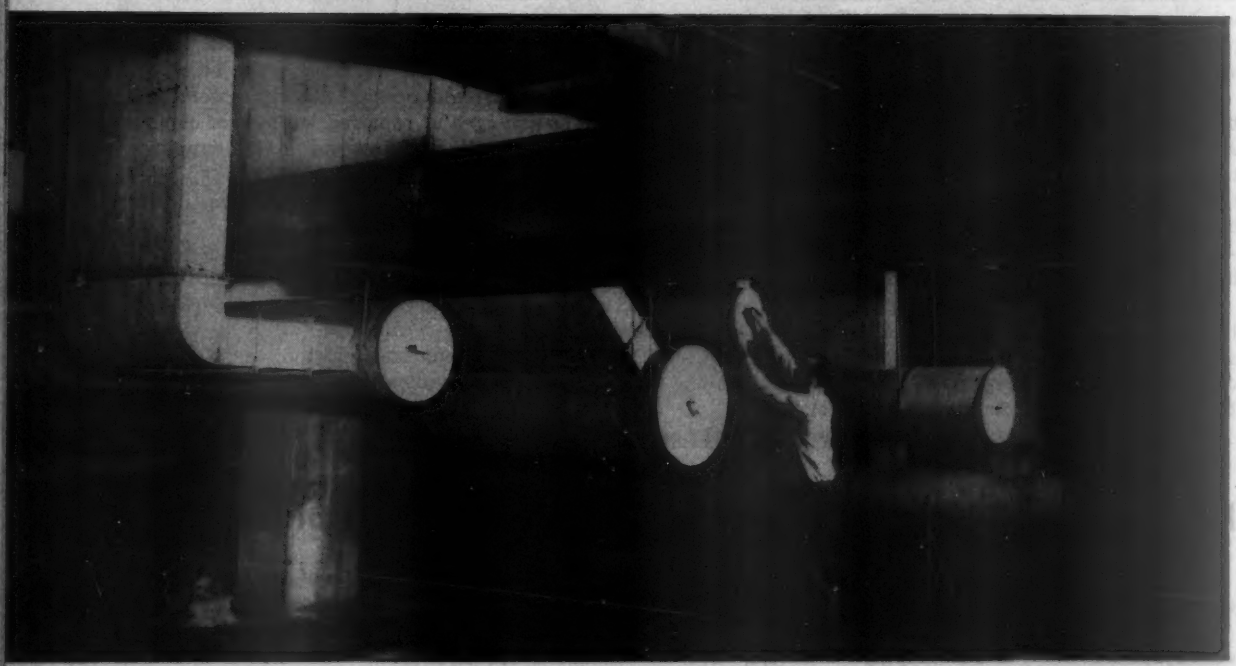
How you can get the Triple-S Program for your plant

RCA Victor is willing to help you set up your own conservation program.

The company will be glad to supply you with additional information on campaign material, including sources. No permission is needed for the use of ideas or the reproduction of material in this article, except for use of trademark. Write to:

J. M. Toney, Director of Public Relations
Radio Corporation of America
RCA Victor Division, Camden 2, N. J.

UPPER LEVEL. No maintenance work to tie up production.



LOWER LEVEL. All piping and ductwork readily accessible.

This plant solved the problem of maintaining equipment without interrupting production. It put . . .

—Production Upstairs . . .

How to get the best layout for continuous and efficient production? How to maintain this equipment with a minimum of interruption to production? This was the two-fold problem faced in setting up a plating room at Federal Telephone & Radio Corporation, Clifton, N. J.

Remember, a plating room is tough to maintain. You can never stop inspecting, servicing, and repairing your equipment if you want to beat corrosion. But you have to keep right on producing, too.

The problem was solved at FTR by a two-level layout—production *upstairs*, maintenance *downstairs*.

After several years developing and using this layout, both the maintenance and production staffs agree it's a good one. And it has the advantage of providing more production space for a given floor area.

On the whole, all production equipment is located on the upper (grade) level. All service facilities are located in a basement of equal area immediately below, from which they are connected to the plating equipment above.

This arrangement does away with all overhead services and bulky ventilating ductwork. Materials handling equipment has free sway. There is better light. Operations are cleaner.

In the basement, maintenance men can get at the facilities at any time without hindering or tying up production operations. Most of the maintenance, except minor servicing of production equipment on the upper level, is done in the lower level.

The upper level—100x105 feet—contains 70 open-top plating tanks for all kinds of finishes. Processes are automatic, barrel, and still type, using tanks for cleaning, rinsing, plating, and second rinsing.

All tanks require from one to five direct service connections for cold water, steam, electricity, compressed air, and drainage. Also, most of them need special ventilation. Ventilation is obtained by slotted lateral outlets along opposite sides of each tank. But instead of exhausting air through both outlets, FTR *blows* air as a "pusher" from one *blower* side to the other *suction* side. Air is exhausted at 200 cfm. per square foot of tank surface, and blown at about one third that rate.

All manually operated tanks, regardless of actual depth, are at a standard working height of 34 inches above floor level. This is accomplished by supporting the entire floor on a network of I-beam girders spanning concrete building columns on 23-ft. centers both ways. Cross beams were placed in sizes and heights to produce level tank tops.

Pushbutton switches, rheostats, reversing switches, and pipeline valves are kept as near to the arm-level height as possible. Selenium rectifying equipment is located off the outside building wall so it can be serviced from both front and rear.

—Maintenance Downstairs

This level houses all distribution pipelines, ventilating ductwork, and auxiliary equipment.

Pipelines for cold water supply, drainage, compressed air, steam supply, and condensate return lines, also power duct, are all suspended from the floor beams within a few feet of the basement ceiling. Blowers are located on foundations at basement floor level.

Ventilation ductwork (supply and exhaust) is run at various basement levels. Fresh air comes in from an outside underground plenum chamber. All exhaust lines coming down from tanks are manifolded into nine main ducts of varying diameters, up to 37 inches. These ducts run parallel and horizontally to a wall opening at one end of the room, which leads into a tapestry brick ventilating shaft discharging at roof level. No unsightly outlet here! A centralized pushbutton station on the upper floor controls the ventilating fans. Red indicator lights show whether the exhaust system is working.

To minimize corrosion FTR used corrosion-resistant materials and design on both levels. Tanks are of stainless steel, or of steel lined with lead or synthetic rubber. Pipe is protectively coated. Where it carries acid solutions it's of special acid-resistant material.

The same goes for liquid pumps. Whatever duct-work is not of stainless steel has been protectively painted inside and outside. Direct-driven blowers have a baked protective finish.

All electric switches are moistureproof. Motors are explosion-proof type. The copper bus power lines are enclosed in duct that is specially painted. Lights on the upper level are of vapor-proof incandescent design; the lower level uses RLM reflector-type fixtures.

Both upper and lower floors are made of acidproof mastic. The lower floor has a sloping concrete base that drains into four catch basins, one in each quarter. These basins drain to submerged waste-treating tanks used to receive and neutralize all drainage from process tanks before it goes into the sanitary sewer.

IDEAS OF THE MONTH for

MOBILIZATION GUIDES FOR SMALL BUSINESS is the title of a brand-new booklet just issued by the National Production Authority. You can get one free from any of the 102 field offices of the U. S. Department of Commerce that represent NPA. For larger quantities, write the Superintendent of Documents, Washington 25, D. C.

BUGS IN YOUR COOLING WATER? Monsanto Chemical Co., St. Louis 4, says Santophen 45 is sudden death to bacterial and algal growth.

YOUR CUSTOMERS WILL APPLAUD if you give 'em the kind of service provided by F. J. Stokes Machine Co., Philadelphia. Stokes keeps task force of six mechanics on 24-hour standby duty. They're ready at a moment's notice to dash off to a customer's plant with parts and service.

IDEAL CARD FILE may well be "Simplafind," a "come-to-me" unit just announced by Wheeldex Mfg. Co., Inc., 40 Bank St., White Plains, N. Y. Flick of switch brings any tray within easy reach in 3 seconds.

SELF-STICKING SAFETY SIGNS take but a few seconds to apply to any clean surface. Silicone plastic coating protects signs against dirt, grime, moisture, weather. W. H. Brady Co., Chippewa Falls, Wis., stocks 550 kinds.

SHREDMASTER may be your best bet to eliminate wastebasket espionage. It reduces confidential records, specifications, blueprints, etc., to unreadable shreds. Shredmaster Corp., 205 Willoughby Ave., Brooklyn 5.

FLUORESCENT-LIGHTED MAGNIFIER, according to Larrimore Sales Co., P. O. Box 1234, St. Louis 1, is "the finest direct-viewing large-lens unit that money can buy." $45 complete with tubes.

RUST CHECKCHART shows where red ruin is most likely to attack. Get your copy free from Dearborn Chemical Co., 310 S. Michigan Ave., Chicago 4. (You'll also get a survey form to help you determine which Dearborn rust preventive to use in each case).

DON'T TEST YOUR LADDERS, says Forest Products Laboratory. That's one of a hatful of facts you'll get from a little booklet distributed—free—by American Ladder Institute, 666 Lake Shore Drive, Chicago 11.

POCKET-SIZE HARDNESS TESTER is just about as big as your slide rule, and just about as easy to use. Price, $25.50. A. H. Co., Brighton, Mich.

Factory Executives

TELEPHONE ANSWERER takes messages, tells caller when you'll return. Is not connected to 'phone. Just plug in and use. Electronic Secretary Distributors, Inc., 803-K W. National Ave., Milwaukee 4.

NU-KRETE, you might guess, is a floor repair compound. But you'll never guess that it can be spread from a feather edge to any desired thickness—to form a tough, flexible, rubbery surface that will carry 12,000-lb. loads on steel wheels or a soft surface for easy walking. Can be used to repair concrete, wood, brick, steel or composition floors—says The Warren Refining & Chemical Co., 750 Prospect Ave., Cleveland 15.

NEED A TECHNICAL MANUAL? Try McGraw-Hill Book Co.'s Technical Writing Service. Or Technagraph Co., 785 Market St., San Francisco 3, which makes a specialty of isometric, exploded, cutaway renderings.

POCKET GUIDE FOR LIFT TRUCK OPERATORS contains many a helpful hint. Towmotor Corp., 1226 E. 152nd St., Cleveland 10.

MICRO-FLAT is a precision surface plate of black granite that is said to be harder than tool steel, non-magnetic, non-deflecting, non-glaring. Available in sizes from 9x12 inches to 54x108 inches. Collins Granite Surface Plate Co., 1331 Santa Fé Ave., Los Angeles 21.

KNOW YOUR KNOTS is just one "chapter" in a dandy little booklet that tells you all kinds of things you ought to know about ropes. Not new, but nice. Plymouth Cordage Co., Plymouth, Mass.

BOOKLET OF THE MONTH is Bakelite's on laminated plastics. Free. Write to Bakelite Division, UCC Corp., 300 Madison Ave., New York 17.

CORROSION RESISTANCE COMPUTER works like a slide rule, rates 13 non-ferrous and stainless steel alloys as excellent, good, fair, or not good for any one of 142 corrosive agents—beer, benzine, borax, or what have you. Free. The H. M. Harper Co., Morton Grove, Ill.

SERVISLIDE is pull-out drawer device that simplifies maintenance of electronic equipment. Remler Co., Ltd., 2101 Bryant St., San Francisco 10.

NEW ABSOLUTE FILTER, for use wherever air must be completely dust-free, is now in production at Cambridge Corp., 350 S. Geddes St., Syracuse, N. Y. (CC is jointly owned by Carrier Corp. and Arthur D. Little, Inc.)

TESTED EMPLOYEES, like Leah Palkey (above), assure Soreng Manufacturing Corporation of good work, low turnover. This is Leah's first day on the job. For details of how she was selected, see facing page.

Tests Help Cut Turnover

By A. R. MICHAEL • Personnel Placement Supervisor
Soreng Manufacturing Corporation
Schiller Park, Ill.

WE'VE CUT the monthly labor turnover rate of our 500-worker plant from 5% to 1.3%— in five months. That's a 74% reduction! Our labor turnover costs have dropped proportionately. And, as the labor market is tightening and our own demand for help is rising, we have a waiting list of 72 interested and qualified applicants. We're sure over 90% will make out well on the job when we hire them.

There are a lot of reasons for these results, and for the improved productivity and employee morale we feel we're now enjoying. But the single most important reason has been the reorganization of our personnel procedures, starting with a new testing program. Now for the first time we are using scientific tools for selecting employees, and have learned how to administer them.

We started thinking about all this soon after we moved from Chicago to a fine new plant in suburban Schiller Park in January, 1950. Our monthly turnover rate had reached 11%. This was partly

RECEPTIONIST SCREENS out obviously unfit applicants. Leah seems to be a good prospect, so gets by.

INITIAL INTERVIEWING is with placement supervisor. He carefully reviews Leah's job history, finds it good.

TESTS FOR MECHANICAL ABILITY come next. Leah's good score suggests she would do well at coil winding.

FINAL INTERVIEW is with coil winding department foreman. Job sounds good to Leah. Verdict: hired.

Rate 74% in Five Months

due to shifting the plant location. But even after we had settled down, the rate hung at 7% a month. Labor shortages were developing, and heavier production demands were being made on us. So we called in John A. Patton Management Engineers to help us get on the beam.

HOW OUR NEW PROCEDURE WORKS

Under our new method, worked out with our consultant's help, responsibility is centralized in the hands of a personnel placement supervisor. He tests all applicants who get by a preliminary screening that weeds out the obviously unfit. He uses the test results to supplement information from (1) a patterned interview, (2) the application blank, (3) a physical examination, (4) a check-up of references. The foreman is called in only after the placement supervisor is sure he has spotted an acceptable candidate. To date 32.9% of all applicants have been rejected.

More on next page

TESTS HELP CUT TURNOVER RATE . . . begins on page 78

Until October, 1950, we used no tests at all. No one person was responsible for employment. All the interviewing and hiring was done by the foremen. This was unsatisfactory. They had nothing on which to base their decisions. And interviewing took a lot of their time—time that could be profitably spent watching on-the-job performance.

The new system may sound complicated, but it isn't. It's actually simpler than the old method, and cheaper in time and money. Furthermore, the yardsticks we now have for pre-testing job applicants are flexible. They have to be in times like these, when defense mobilization limits the supply of good workers. The "critical scores" can be moved up or down, depending on the labor supply.

Even if the time comes when we must hire practically everyone who applies, the test results will help us place the people we can get in the most suitable jobs.

DOLLARS-AND-CENTS BENEFITS • Savings loom large in assessing the practical benefits of our selection and placement program. We have compiled statistics that show it costs us a minimum of $55 to train a replacement for most shop jobs. In some jobs the figure runs up to $110.

In the first five months, we tested and hired 88 applicants. Only six failed on the job (7.8%). In the same five months we also hired 45 applicants who were *not* tested. Of these, 22 failed on the job (49%). If these 45 people *had* been tested, we might have had to replace only 4, instead of 22. By *not* testing everybody, we therefore lost a minimum of $990 ($55 × 18) in five months.

On the other hand, consider how much we *saved* by testing the 88 applicants that we did test. We might have had to replace 49% of them, or 43 people—instead of only 7.8%, or 6 people. Our *saving* in this case amounts to $2035 ($55 × 37).

HOW OUR TESTING PROGRAM WORKS

For shop jobs we use only one test—the MacQuarrie Test for Mechanical Ability. We use it to help us pick candidates for 25 out of the 34 job classifications listed on our application blank. It's the most important element in our program, so it deserves more explanation than the tests used for clerical and engineering jobs.

The MacQuarrie Test has seven parts, each scored separately. They are: (1) tracing, (2) tapping, (3) dotting, (4) copying, (5) location, (6) blocks, (7) pursuit. These labels don't explain much, taken alone. In one way or another they relate to speed of reaction, ability to coordinate eyes and hands, and ability to see space relationships.

The test is a short one. It's easy to administer because the only equipment needed is a blank test, a stopwatch, and a pencil. It's such a simple test that, at first glance, it seems pretty far removed from jobs like punchpress operation, coil winding, and inspection. But it works for us.

Some shop jobs need only one MacQuarrie subtest. Others need all seven. For coil winding the score on the tracing test is the one that separates good operators from poor ones. But for the job of calibrator we use the total test score. And candidates for eyelet and riveting machine jobs must exceed a minimum score on three tests—*tracing*, *tapping*, and *pursuit*.

Here are some examples of how well the MacQuarrie scores separate the good operators from the poor. The table (right, above) shows average percentile scores of these two groups of several different kinds of work at Soreng.

Read the table like this: The average score of good calibrators equaled or exceeded the scores of 71% of all the workers who took the MacQuarrie test. But the poor calibrators' average equaled or exceeded only 14% of all who took the test.

PERCENTILE SCORES

Type of Work	*Good Workers*	*Poor Workers*
Calibrator	71%	14%
Inspector & Tester (Production)	65%	25%
Inspector (Quality Control)	30%	10%
Eyelet & Rivet Machine Operator	20%	3%
Coil Winder	11%	5%
Punchpress & Machine Operator	10%	2%
Factory Average	16%	3%

For clerical jobs we use two tests: The Wonderlic Personnel Test (mental alertness), and the Minnesota Clerical Test. We group clerical jobs into four classes: stenographer, general office clerk, timekeeper, and expediter and expediting clerk. We had supervisors rate a sample group of people on these jobs. Then we gave the tests, and set minimum hiring scores for each type of work by correlating test results and ratings.

For engineering jobs we use a battery of six tests: Wonderlic Personnel Test; Minnesota Clerical Test; Minnesota Paper Form Board (ability to see space relationships); Bennett Test of Mechanical Comprehension, Form AAA; How Supervise—Form A (supervisory ability); and the Kuder Preference Record (a vocational interest test).

This battery of six tests was given to a group of engineers employed in the plant. Their scores were analyzed, along with data obtained from testing successful people on similar jobs in other companies. We thus get enough information to set up a test pattern or "profile" to help guide us in hiring employees for engineering and research jobs.

We Must Pay As We Go

***We** must do our utmost to pay as we go for our present defense program.*

On that proposition those who speak with authority are remarkably well agreed. This editorial – the second in a series on our mobilization for freedom – sets forth in simple terms why there is this agreement.

Next year – the fiscal year beginning next July 1 – the federal government's budget calls for the expenditure of $10 billion more than is scheduled to be collected in taxes. The deficit is due to the increase in defense expenditures.

A part of this deficit can be eliminated by cutting non-essential expenditures and increasing efficiency in the defense program. There is wide agreement on this. It is the duty of the President and Congress to see that it is saved.

How the remaining deficit anticipated in the federal budget—$5 billion to $10 billion—is handled is crucial. The government can meet it by raising taxes—by paying as we go. Or it can borrow, issuing more government bonds.

Borrow Again?

We relied heavily on borrowing in both World War I and World War II. In World War I only about one-third of the expenditures of the federal government were met by taxation. In World War II about 45 percent were met in this way. The rest we borrowed. Some people ask, why can't we rely heavily on borrowing again? Why is it crucially important to avoid adding $5 billion to $10 billion to a federal debt that is already $257 billion?

Part of the answer is found in the contrast between this defense program and our all-out effort of World War II. Another part—and one that is all-important in combatting inflation—results from the rapid decline in the purchasing power of the American dollar in recent years.

We went "all out" in World War II. We put almost half of everything we produced into our military effort. Taxes high enough to pay the financial costs as incurred would have meant huge tax increases. It was feared that such increases would kill financial incentives to get "all out" production. Since we expected the war to be short, borrowing seemed a safe expedient. Price control and rationing, with wartime patriotism to give them effective support, were relied upon to keep in check the inflationary pressure created by borrowing rather than taxing.

Our present defense program is scheduled to take a much smaller share of our production, but to take it over a much longer period. At its peak, the program as now planned will take only about 20 percent of our total national production. But, to use General Bradley's phrase, "the conditions under which we labor may persist for ten, fifteen and twenty years."

What About Controls?

For a period of any such duration it would be foolhardy to expect that the sort of controls we had for the few years of World War II could hold in check the inflationary pressure created by not paying as we go. It would be as foolhardy as it would be for a family to plan on borrowing to pay the expenses of a member discovered to be afflicted by a chronic ailment which might last a long lifetime.

Obviously, the only safe thing to do in such a case would be to adjust the family budget so that the expenses of the illness would be paid currently.

Our heavy reliance on borrowing in World War II had consequences which block a successful repeat performance.

If the borrowing had been done by persuading individuals to transfer their savings into government bonds, relatively little inflationary pressure would have been created. What the government would have spent with the proceeds of such bond sales would have been subtracted from the money individual consumers could spend.

But most of the borrowing was done from banks. That course expanded the amount of money available to the government without any offsetting subtraction of money from the hands of individuals. Thus, when direct price controls were removed after the war, this bottled-up purchasing power contributed to a price inflation which has cut purchasing power of the American dollar about in half – and decidedly changed the attitudes of the American people toward that dollar.

During World War II, Americans in general believed that:

The war would not last long.

The dollar would hold its value, and even gain value after the war.

Many wonderful new products would be available in the postwar period.

Today the American people have:

Seen the value of their dollars melt away fast.

Been assured that, at best, we may have a 10-15-20-year pull ahead.

Been warned not to expect a postwar paradise anytime soon.

One result of these changed attitudes is a notable lack of enthusiasm for government bonds on the part of individual investors. This is indicated by the fact that since Korea redemptions of E bonds have exceeded sales by about $600 million. Another result is a continuing rush to convert dollars into physical goods and equipment or claims on them. This trend weighs against financing the prospective federal deficit by borrowing from individuals.

Borrowing from banks to meet the deficit would again add fuel to inflation.

The prospective deficit is due to federal expenditures for military goods. Even if they are not blown up or shipped abroad, these goods will not be available to civilians. But the money paid to those who produce military goods will still be available to bid up the prices of civilian goods. Thus, at a time when people show relatively little disposition to save dollars, a menacing inflationary pressure – an inflationary gap, the economists call it – will be created.

If our fight against inflation is to be successful this gap must be closed by taxes. We need to do other things, too, for inflation has many different causes. Credit expansion must be effectively controlled. Production of civilian goods must be increased as much as possible by eliminating waste and inefficiency. But a pay-as-we-go tax program is basic to a successful attack on inflation. And inflation – unless it is checked – could wreck our defense effort.

We cannot pay as we go merely by soaking harder the corporations and those in the upper income brackets.

As the President's Council of Economic Advisers has reported, "by far the largest part of the additional revenue must come from the middle and lower tax brackets. These are the brackets in which the great bulk of the income is located."

Taxes Can Attack Inflation

By spreading tax increases broadly, taking small amounts from many people, inflationary pressure would be effectively reduced. It is the expenditures of the great mass of people, rather than the small numbers in the upper income tax brackets, that create most of the pressure. Moreover, it is possible to increase taxes broadly without killing the economic incentives to produce. Maintaining these incentives is essential to the success of the defense effort.

Our elected representatives cannot be expected to be enthusiastic about a pay-as-we-go tax program. It involves increasing the taxes of the great body of their constituents, an operation completely lacking in political glamour. However, such a program also involves the integrity of the American dollar. And that is absolutely essential to the success of the defense program. We shall be very foolish if we do not let our leaders know that we want them to do everything possible to pay as we go.

McGraw-Hill Publishing Company, Inc.

Better Handling

...the Best Way To Save Manpower, Speed Production

- Those are industry's big problems *today*.
- This 32-page report will give you *fresh ideas on how to go about doing a better job of materials handling*—no matter how well or how poorly you're doing it now.
- The report starts with a conversation between Fred, who is doing an alert handling job, and Joe whose plant has a lot to learn about modern handling. Joe learns—and so can you—*how to get off to a good start toward better handling.*

Like I told you over the phone, Fred, we've got this big defense order piled up on top of everything else. We hardly know where our next ton of steel is coming from. But that's not the half of it. We'll get the steel somehow. The thing that's got us scared stiff is people.

I don't wonder. They're getting scarcer every day. The good ones, that is. The smart way out is to increase productivity—boost output per man-hour.

You been talking to my boss? That's exactly what he says. He says the best way is to do a better job of materials handling. "Go over and see Fred," he said. "He's forgotten more about handling than you'll ever know." So that's why I'm here. He thinks even I *might pick up an idea or two.*

You might at that, Joe. Just sit here at the feet of genius. Kidding aside, though, your boss is right. I don't mean in his estimation of you. I mean when he says better handling is the best way to increase productivity.

That six-bit word always stops me.

Me, too, to tell the truth. Your boss means, of course, that handling's the best way to save manpower and speed up production.

Sure. But is it really the best *way?*

That depends. Certainly I can think of technological improvements that might do a bigger and better job for us. But they take time—which we haven't got. So put it this way: Better handling is the *fastest* way to save manpower and speed production.

More on next page

BETTER HANDLING . . . begins on page 81

No Handling Job Is So Good It Can't Be Improved

So you think better handling is the fastest way to save manpower and speed production? That I'll buy.

And when you do, you buy a lot of other things. At least that's our experience. We set out to improve a handling job because we know it'll save us man-hours and speed production. And we end up with a lot of other benefits.

Such as—?

Such as steady flow of parts and materials, in place of costly stop-and-go production. Shorter manufacturing cycles. Smaller inventories. Quicker deliveries. Better use of space. Better working conditions—they're specially important in times like these because, other things being equal, the better workers sort of gravitate to the plant that's the best place to work.

You can say that again. As a matter of fact, Fred, we've improved a lot of our handling practices. And we're getting a lot of those benefits you just reeled off. What bites me is why the boss suddenly picks on me. I thought we were already doing a pretty good job of handling.

Pretty good is probably right, Joe. I hate to sound like teacher. But one of the first things we all have to learn about handling is that nobody ever does the job so well it can't be improved. Did you see the new book by Raymond Loewy? You know, the designer? Our chief engineer showed me his copy this morning. Said he thought I'd get a kick out of the title. Well, I did. It's "Never Leave Well Enough Alone." Not a bad slogan for us guys in production who have to find out ways to conserve manpower and—

Okay, okay. But look. You people make whammits. In lots of sizes, I admit. But they're all whammits. And you can operate on a mass production basis—

Sure. And *you* make thripples, which everybody knows are built to order. So *you* have to operate on a job-shop basis.

That's what I mean—even with this big defense order we can't change over to anything like your straight-line production. So—how'm I going to get any bright ideas out of what you fellows are doing?

Joe, Joe. Where've you been all these years? Of course our products aren't alike. Of course our methods are different. But don't you see that we're both in the same business when we come to handling parts and materials and finished goods? You really *can* pick up handling ideas in our plant. You can pick 'em up in any plant. Why, last time I was in Chicago I went out to see a friend of mine at Formfit—

Formfit? Sounds like—you know—

Sure. It *is*. They make girdles and bras.

Don't tell me girdles and bras gave you ideas.

They sure did. And I mean handling ideas. Why, they've got a double-deck conveyor that'd put your eye out. The operators take stuff off the upper deck and put it back on the lower deck.

The Forum's story begins on page 96

Don't tell me there isn't some spot in your plant where you couldn't use the same idea "as is" or adapted to your own special problem.

All right. I'll go quietly – But tell me, Fred, what do I do? Look, the boss says do a better job of handling. How do I go about it?

Systematically. Just the same way you'd go about any other job in the shop. First thing, I think, is get yourself a committee. You know your setup, so I won't suggest names. But be sure you get the production people who have the greatest stake in better handling. I mean your production manager, your department superintendents, and so on. And don't forget to include your plant engineer. Nobody knows so well as he what you *can* do and what you *can't* do. Boy, can he save you headaches!

First, get a committee

Okay, I got my committee, where do we go from here?

Simple. I'll give it to you in four steps: First, find the places where you're doing a bad job of handling. They'll stick out like sore thumbs. Look especially for places where production workers are spending a lot of their time handling stuff.

Four easy steps

Guess we can dig up a couple without calling in the bloodhounds. What next?

Next you pick the worst job of all. Step three, you improve it. Step four, you pick the next worst job. And so on down your list.

You make it all sound so simple. But look here, Fred, this is a mighty tall order. Where does it begin? And where does it end?

You mean, what *is* handling and what *isn't*?

Sure, maybe I ought to get myself a definition.

You should – *for your own plant.* All you need to know is what *you* are going to call handling in your shop. Take my advice. Start with a literal interpretation. That means handling *all* materials. Not just production materials, but production tools. I mean things like dies, jigs, and fixtures. I also think you want to include maintenance materials. You can kiss a lot of machine time goodby just because the maintenance department has to roll up a spare part on a dolly where a power truck would have had it on the spot in two jiffies. Above all – and forgive me again if I sound like teacher – don't make the mistake that handling costs are confined to the operations of trucks, conveyors, and other handling equipment. You have to consider a lot of other costs closely allied with handling.

They're the hard ones to recognize.

Not too hard. Take the cost of financing in-process inventory. Take losses caused by damage during handling. Or time spent by production workers servicing themselves with parts and materials. Or cost of idle machine time due to waiting for materials. Even you, Joe – if I may quote your boss – might know such costs when you see 'em.

More on next page

BETTER HANDLING . . . begins on page 81

How To Start Improving a Materials Handling Job

What you're saying, I guess, is that you have to know what handling is costing you before you can pick that one worst job to start working on. So now let's assume I've stumbled onto my one worst job. What do I do next?

Now you're ready to get the facts. First, make a survey of present practice. Start at the beginning. Make yourself a flow chart. Follow the path of each part, or group of parts, from start to finish. Note on your chart each move, storage, inspection, operation, and regular delay. You don't have to make your chart too elaborate. What you're shooting for is a picture of the physical movement problem.

Here are just a few of the dozens of questions you'll want to get answers to: How often and how much is transportation equipment delayed when delivering parts and materials? That takes labor and equipment drive. It's one reason for trying to use self-loading and unloading equipment.

Get answers to these questions

I know. Like the pallet loader. What else?

What size is the material unit delivered? Could it be bigger? It takes more man-hours to handle 100 units weighing 10 pounds each than it takes to handle one unit that weighs 1000 pounds, assuming you have the right equipment. Also, handling 100 units can slow production and take up more space.

Then there are questions like how much labor does it take to handle material per unit of time at normal operation? Is there a lot of manual handling? A little? Not just by production workers. But also by maintenance men and the materials handlers. The man who drives a power truck, for example.

Ask yourself, too, if space is jammed with materials. Is height being utilized for storage? How far is material moved? What's the ratio to straight-line distance — as the crow flies? How old is your handling equipment? Maybe its obsolete and costing you manpower, production, space, and worker fatigue. How many different kinds of equipment are you using to do the same job? How often is handling equipment down for repairs? How long? That can cost you plenty. A good program of preventive maintenance is the answer.

And these

We've got that.

Don't say no till you have to

You're lucky. You'll also be lucky if you can work out some good incentive plan for handling. For your truck operators. They step up the pace. They get more dough. Everybody's happy —

— except the business agent of the local union.

Oh, even he may see the light if you go at it in the right way. If he doesn't, maybe you take the worker out of the picture. Is there a chance that the material could move itself? By gravity? Don't say *No* too quickly. Sometimes — a lot of times — it pays to raise the material up to the point where it can move by gravity to the next operation. Tell you where they're doing this with great success. Out at Ohio Rubber.

The Ohio Rubber story begins on page 88

Another plant I expect I ought to visit. Maybe the boss will let even me go and see it. But let's say I've got a good picture of the way we're doing a handling job now. Even I can see that I have to figure out how to improve it. What's the best way?

Page 82, June 1950 FACTORY

Well, I read a good one in that special handling story FACTORY published last year. The fellow who wrote that article said to figure out the "ideal plant for your operations."

Not too bad an idea.

No. His theory – which I gather he backs up with actual practice – is this: To make the most of your present plant when you rearrange its layout, be sure the plan is as close to the ideal as possible. So you just assume that big boss of yours tells you to start from scratch: Build yourself a new plant. How would you plan to do your handling? Of course you'd have to start compromising all along the line. The trick would be to come as close to the ideal way as possible.

Darned if I don't think it's worth trying. But, Fred, seems to me so far it's been planning, planning, planning. Now you know me –

Eliminate! Minimize! Mechanize!

Oh, sure, the man of action. So all right we get some action. That same fellow writing in FACTORY says you do three things: Eliminate all possible handling. Minimize moves that are left. Mechanize wherever you can. *Eliminate, minimize, mechanize.* Three big words that can see you a long way on your road to better handling – to saving manpower and speeding production.

But how, Fred? I can see this job in my mind's eye. But I'm stumped when I try to get my teeth into it. Isn't there some way to get the whole problem down on paper? Seems to me that's important, because I got that big boss to sell.

Page 90, Jan. 1948 FACTORY

It *is* important. We all have to sell that big boss because he's the guy that has to say *Yes* before we get the dough to buy new equipment. So – sure you have to get the thing down on paper. There are lots of ways to do this. We're using a modified version of a system worked out at Westinghouse. There are two forms. One's called a "single-item handling questionnaire." You use it when one item makes only one move. The other is a "materials handling analysis" form – to be used when you want to analyze an existing and a proposed series of related handling operations. Westinghouse also worked out a "checklist of materials handling equipment" for use as a guide to selection.

Those I'd like to see. Fred, this has been a swell session. I don't want to spoil it all by sticking around too long and wearing out my welcome. How about giving me copies of those forms?

Glad to, Joe. And come back any time. I'll show you how we use the forms. Meanwhile, if you get to Chicago –

I know. See if those bras out at Formfit give me any ideas!

Formfit is one of 10 handling studies in this issue... For a quick summary of problems, solutions, and benefits – turn the page

How 10 Companies Used Better Handling

Better Handling

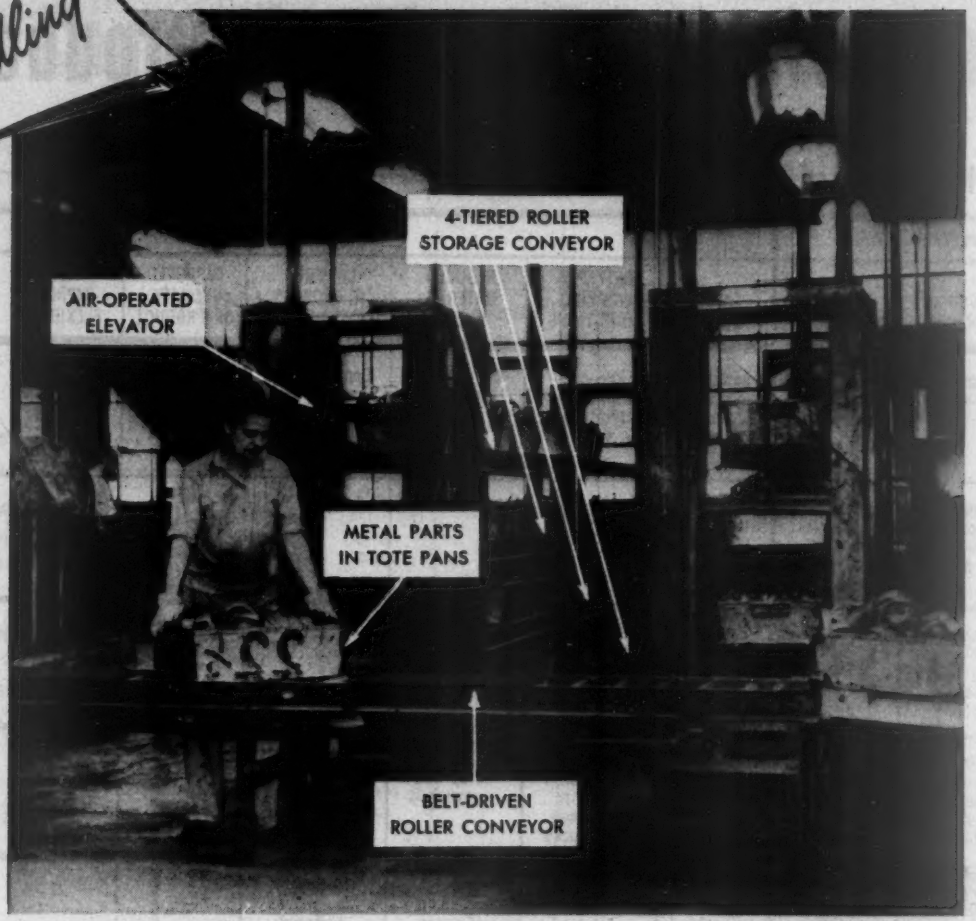
COMPANY	PROBLEM	HOW THE PROBLEM WAS SOLVED					
		CRANE AND HOIST	CONVEYOR	INDUSTRIAL TRUCK	CONTAINER	POSITIONER	OTHER
The Ohio Rubber Co. Willoughby, Ohio *Case Study – page 88*	To get more production in limited space		Belt, live roller, gravity roller, trolley		Tote pans	Elevating conveyor sections	Air-operated switches
The Baker-Raulang Co. Cleveland *Case Study – page 91*	To keep production steady with regular supply of sheared steel plates	Floor-controlled bridge crane				Ballbearing table	Plate grab
Bigelow-Sanford Carpet Co., Inc. Thompsonville, Conn. *Case Study – page 92*	To handle larger in-process inventory			Fork lift	Skidded wood container		Towing dollies
The E. F. Hauserman Co. Cleveland *Case Study – page 94*	To increase production capacity of the same space	Automatic elevating sections of rail	Monorail chain				Automatic carrier return solenoid switches
The Formfit Co. Chicago *Case Study – page 96*	To reduce handling manpower		Belt, live roller, gravity roller		Lightweight tray		
Standard Ry. Equipment Mfg. Co. New Kensington, Pa. *Case Study – page 100*	To move heavy stampings from press to railroad car	Floor- and remote-controlled crane	Twin gravity rollers			Hydraulic lift upender	Special crane-rig car puller
General Electric Co. Bridgeport, Conn. *Case Study – page 102*	To use unit loads to save manpower and materials			Fork lift	Corrugated with inserts		Expendable pallet
The Jeffrey Mfg. Co. Columbus, Ohio *Case Study – page 104*	To break production bottlenecks	Cab-controlled bridge crane	Monorail, trolley, gravity roller	Fork lift, high lift conveyor platform	Tote pans, roll-over dump boxes		Feeding hoppers at machines
The Aluminum Cooking Utensil Co. New Kensington, Pa. *Case Study – page 107*	To package and ship higher production		Live & gravity roller, belt, wheel, chutes	Fork lift			Elevator
Bridgeport Brass Co. Bridgeport, Conn. *Case Study – page 110*	To move material through production without delays			Fork lift platform	Steel pallets, skidded tote boxes		Truck attachments

to Save Manpower, Speed Production

HOW THE COMPANY BENEFITED

PRIMARY BENEFITS		SECONDARY BENEFITS						
SAVED MANPOWER	BOOSTED PRODUCTION	SAVED SPACE	BETTERED WORKING CONDITIONS	REDUCED MATERIAL WASTE	LOWERED IN-PROCESS INVENTORY	IMPROVED QUALITY OF PRODUCT	IMPROVED FLEXIBILITY	OTHER
Cut handling man-hours over 50%	Cut production delays	Lowered floor area per unit of production	Reduced heavy physical work	Cut damage and loss of material	Constant flow knocked out need for big reserves	Better handling reduced damage		Improved control of production
One man and equipment does the work of two	Shear keeps fabrication supplied with plate —no waiting						Can supply steel plates to production as needed	Saved on lower price of purchased steel
Eliminated "bucket brigade" piece handling	Capacity production handled without delay	Increased use of air rights	Eliminated monotonous hand-to-hand handling	Minimized spoilage		Cut number of handlings	Can change size and location of storage quickly	
Less handling labor for more production	More production with less handling labor	Overhead conveyor saved floor space	Carriers on monorail easier to push than floor trucks	Reduced scrap and rework	Faster continuous flow requires less work-in-process			
Eliminated material movers between operations	Converted operator handling time to production	Double- and triple-deck conveyors save space	Reduced worker fatigue	Lowered rejections of soiled and damaged garments	Continuous flow moves material faster			
From 9 men to 5 men —44%	Speeded production on its way		Reduced heavy lifting				Switched from box to gondola railroad cars	
Saved 33% of handling labor	Production packed faster in larger containers	New unit load stacked ceiling-high					Speeded loading and unloading	Cut shipping material cost 40%
Lowered handling man-hours per unit produced	Increased output of individual machines	Converted handling space to production	Reduced accident hazards	Cut scrap losses	Faster handling reduced material in process			Improved housekeeping Met schedules
Reduced warehousing and shipping costs 20%	Eliminated packaging and shipping bottlenecks					Reduced claims for damage due to handling	Brought postoffice into plant	Speeded deliveries Reduced errors
No more labor "gangs" to handle materials	Production machines don't wait for materials		Let machines do the heavy work		Fast moving cut need for big working inventories			

Better Handling



METAL PARTS for molded rubber products are transferred by air-operated elevator from 4-tier storage conveyors (background) to belt-driven roller conveyor that moves them to production.

Integrated System Doubled

By M. D. COVERT
Chief Industrial Engineer, The Ohio Rubber Company
Willoughby, Ohio

PROBLEM: *to increase capacity and control flow of metal parts, rubber stock, and finished items.*

SOLUTION: *moving parts and materials to the right place, at the right time—in tote pans, on roller and belt conveyors.*

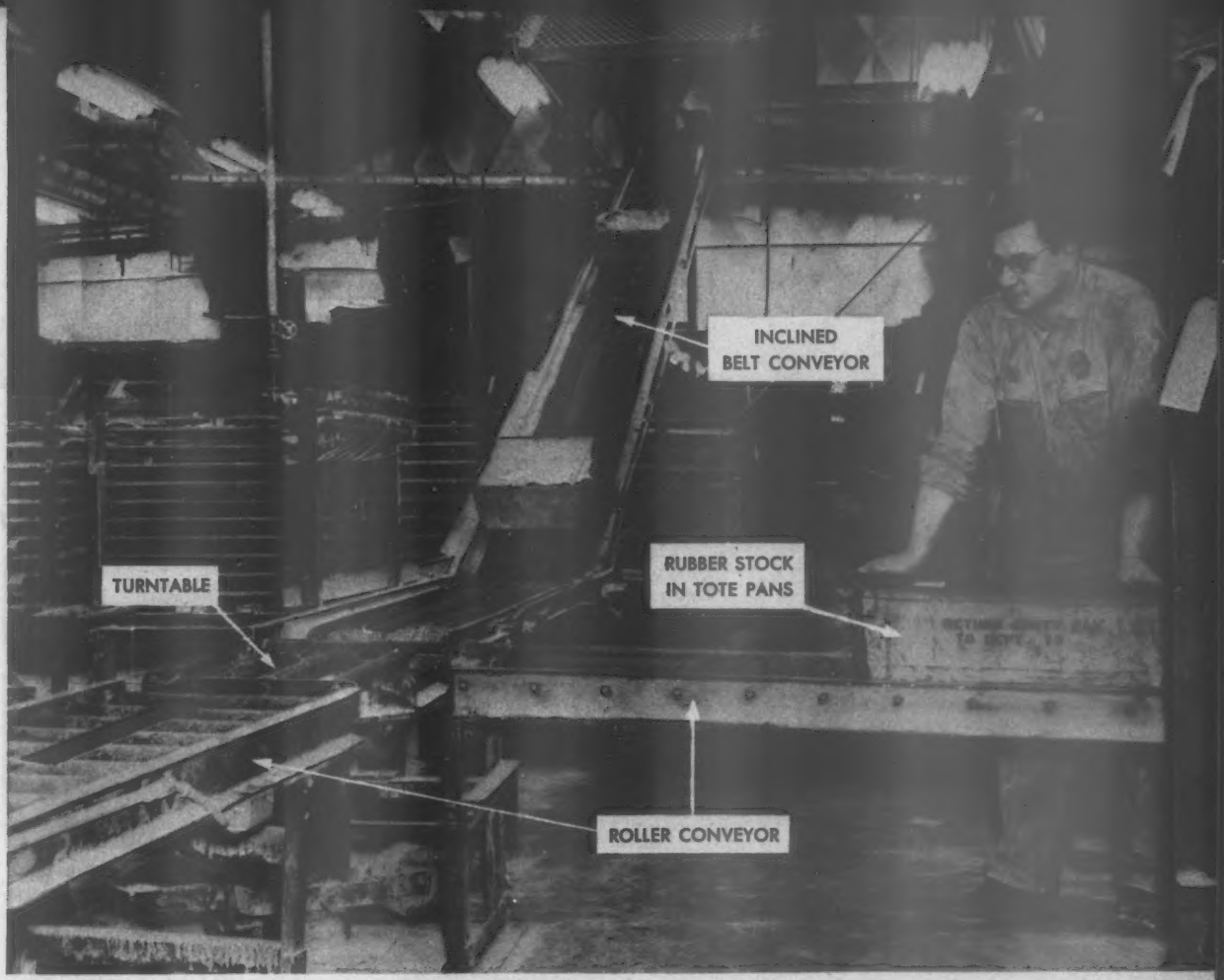
BENEFITS: *Cut handling labor costs by more than 50%. Boosted our production rate. Improved working conditions. Reduced process inventories. Condensed space per unit of production. Cut material waste.*

WE'RE STILL AMAZED by the benefits we got from improving our handling methods. We're convinced it was one of the best projects we ever tackled.

There had been a gradual change of products in our Molded Goods Division. Manufacturing capacity was overloaded. Space was at a premium. Labor costs for handling were high.

That wasn't all. We also had to double our capacity. That meant overhauling the whole division. And revising materials handling practices.

Selection of methods and equipment. After carefully considering the *pro's* and *con's* of alternate methods of handling, we decided to use conveyors and tote pans. Incidentally, we had been using these tote pans and found them satisfactory; we just had to handle them better.



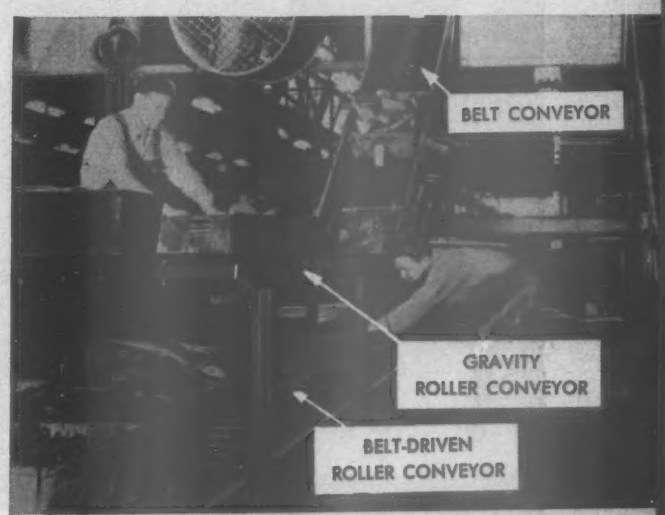
RUBBER STOCK is added to flow. Turntable aids transfer from rollers to belt. Inclined belt takes tote pans of metal parts and rubber stock upstairs to controlled gravity "declines" that feed the curing presses.

Our Production

We selected roller conveyors to do the basic job, because our analysis proved them best for our conditions. To that equipment we added devices to keep enough material moving to the right place, at the right time. They include power-driven sections, switches, elevators, inclined belts, 4-tier temporary storage sections, and gate sections to permit safe walking.

How the system works. The photographs show how we put this equipment together to form an integrated handling system. It carries all production materials from raw stores to the warehouse with least effort consistent with economy.

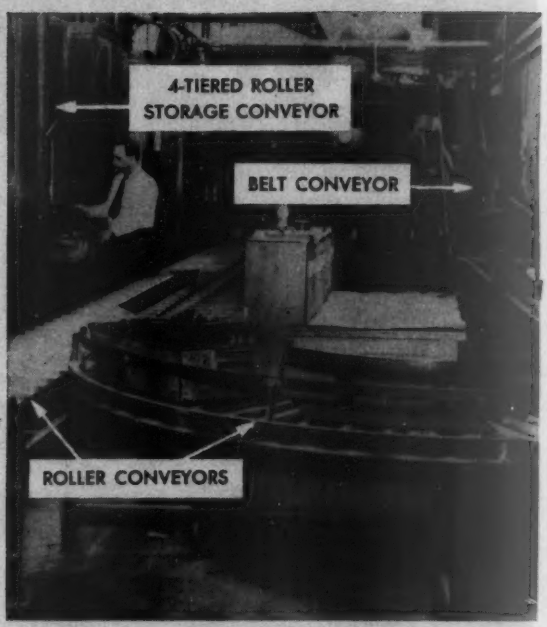
More on next page



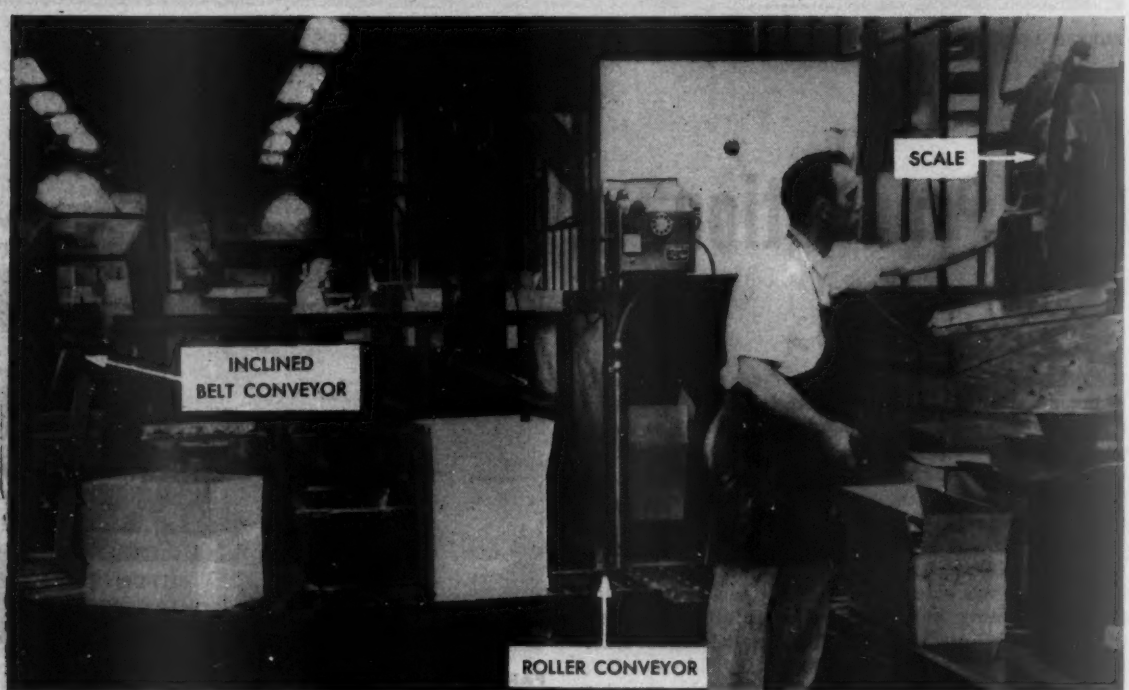
PARTS AND STOCK for curing move down decline to gravity roller conveyor (top deck) which serves press operators. Cured parts are placed on live roller conveyor (lower deck), which delivers them to collection system.

How Ohio Rubber Uses Integrated Flow

CURED PRODUCTS are transferred from the live roller conveyors (see last photograph on preceding page) to belt conveyors that take them "upstairs" to the main collecting line. Up there they will move again by gravity.



PRODUCTS move down decline to central check point. Operator checks tote pans, then spots them in 4-tier roller conveyors. They are stored there till trimming and finishing departments are scheduled to work on them.



FINISHED GOODS in cartons, ready for shipment, are weigh-checked. Then cartons move by roller conveyor to inclined belt and are raised to gravity rollers that carry cartons to finished goods warehouse and storage.

Better Handling

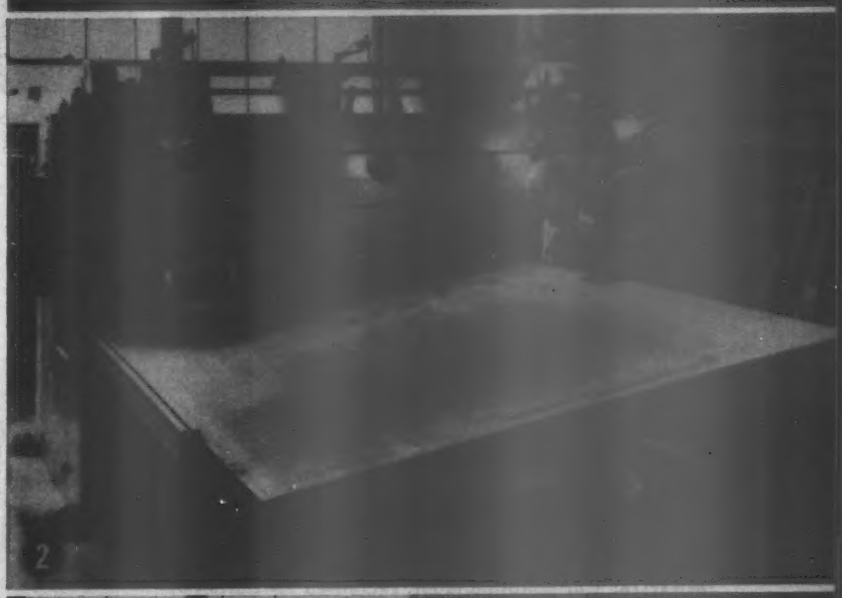
One Man Does Work of Two

PROBLEM: *Baker-Raulang Company, Cleveland, used to buy sheet and plate components. Costs were high. Deliveries erratic and undependable. The company figured the way out was to do its own shearing.*

SOLUTION: *a heavy-duty shear, a special positioning table, and an electrified crane.*

BENEFITS: *Greater flexibility—now the company can handle its square shearing without depending on outside sources, can work new designs without farming out the parts to a fabricator. Surer supply of parts—no longer does Baker have to depend on the steel fabricator. Lower costs—when Baker purchased processed parts, it had to pay a premium of 15% to 20%; now, by buying raw plates direct from the mill, it has eliminated this extra cost.*

IN ADDITION, the greater flexibility has increased efficiency by one third. As a result of the improvements outlined above, more direct labor can be employed without increasing the overhead by any appreciable amount, thereby lowering the burden ratio. Lower burden and lower material costs mean lower production costs, and lower production costs justify the money spent making the change.



ONE MAN *with a floor-controlled crane (picture 1) moves raw plate from storage area to shear.*

SAME MAN *(2) positions raw plate on shear by wedging edge against a stop (left) and lowering plate slowly. Crane does the work.*

SAYS HE: *Ball transfer joints (3) make lateral movement easy. It's a one-hand operation.*

FORK TRUCK puts a standard container on dolly. Front panel of container is hinged for accessibility.

TRAIN OF DOLLIES is towed to the storage area by fork truck. It carries an extra container on the fork.

How We Handle Bigger

By ARTHUR O. HUCK, Methods Supervisor
Bigelow-Sanford Carpet Company, Inc.
Thompsonville, Conn.

PROBLEM: *how to handle more in-process inventory, with labor and storage space becoming critical.*

SOLUTION: *standard-size containers that can be stacked, a fork lift truck, and 4-wheel dollies.*

BENEFITS: *Cut handling labor. Increased utilization of space. Reduced material waste. Made storage area flexible.*

MAYBE IT SOUNDS FUNNY to be talking calmly about bigger inventories. Certainly you'll expect me to be telling you how we cut them down to size. But no, that wasn't our problem. Our problem was *how to handle them.*

This is not to imply that size of inventories is no concern of ours. It is, of course. Like everybody else, we have to keep our stocks of in-process materials within economic bounds. But our inventories were bigger because we had increased our production. The nature of our products (rugs and carpets) is such that we simply have to maintain bigger yarn inventories when volume is high.

So, when we realized we were going to have to up our production, we were just naturally faced with the prospect of transporting a lot more packages of yarn.

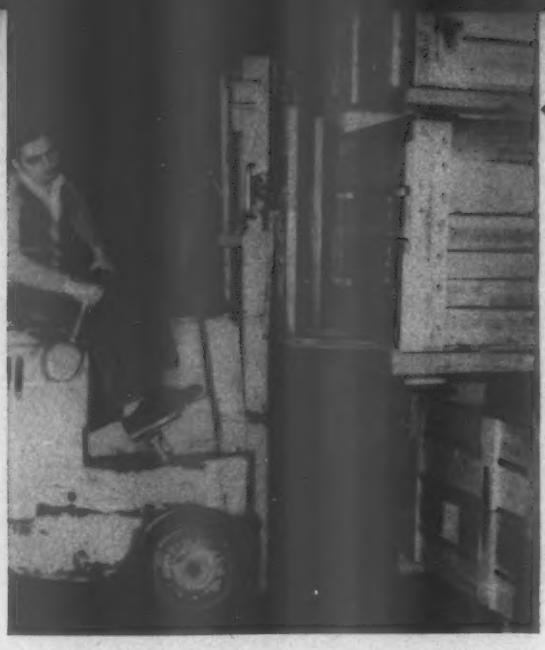
It meant (1) more labor to handle the yarn; (2) more floor space and more bins to store it in; (3) more hand trucks to move it.

Something had to be done. And we did it. Here's our solution, beginning with the old way.

OLD METHOD

At final yarn making, operators placed 1-lb. "packages" (wound on spools) in floor trucks.

- Workers pushed trucks about 250 feet to storage area.
- Two—sometimes three—men transferred packages hand-to-hand from trucks to bins. Some bins were 9 feet above the floor.
- Last operation was reversed when yarn was required for weaving. Storage period ranged from a day to a month, occasionally longer. Of course, some yarn went almost directly from making to weaving (and still does), so we just left it in the trucks.
- Workers pushed trucks about 450 feet from storage to weaving.



CONTAINERS OF YARN are stacked three-high in storage by fork truck. Containers are ¾-inch hardwood.

Inventories

The faults were obvious . . .

We immediately spotted the costly and dull task of transferring the yarn from truck to bins and back by hand. Tossing packages, and dropping a few, wasted some material. Also identification of each lot of yarn through these transfers wasn't always positive; yarn mixes were not uncommon. Inflexibility of fixed storage bins often meant several small yarn lots in the same bin to conserve space, or larger lots in half-filled bins. As yarn lots were woven down toward depletion, a certain amount of rehandling and consolidation was necessary to make way for new lots. Last—but not least—pushing hand trucks about 700 feet with 600-lb. loads was certainly an obsolete way to handle materials.

. . . but not so easy to correct

Maybe these faults seem obvious, but corrective measures were not. That's because a lot of related requirements had to be dovetailed to get the best compromise of quality, safety, and cost. Here are some of the factors we analyzed separately, and in relation to each other:

- Yarn inventories must support both economical yarn production and flexible weaving.
- Yarn in process includes numerous varieties of colors and lot sizes—from several hundred to many thousand pounds.
- Variable quantities of each yarn variety are required at weaving looms.
- Building and equipment limitations must be observed, including aisles, elevators, and floor loads.
- Handling and storage of yarn must be flexible—to meet many variable in-processing conditions.

← NEW METHOD

We decided the answer was a yarn container that could be moved fast and stored as a unit.

Here's the equipment we adopted:

- An open-top hardwood container, with attached skid. It holds up to 288 yarn packages, our standardized maximum lot size. Upper half of one side is hinged for workers to reach bottom easily, and get to yarn when containers are stacked.
- A 4000-lb. fork lift truck to tow and stack containers.
- Several 4-wheel dollies to tow 6 to 8 containers in a train.

Here's how the new method works:

- Yarn packages are placed in containers at the final yarn-making operation.
- Fork lift truck sets containers on dollies and tows train of 6 to 8 to storage area.
- Same truck lifts containers from dollies and tiers three high in storage area.
- Operation is reversed when yarn is required for weaving. Containers are set on dollies and towed to looms.

You'll note the new method eliminated the old "bucket-brigade" handling. That saved man-hours and cut out spoiling yarn by dropping. Space is better utilized, too, because containers are smaller than the old bins, so they're more nearly filled. Also, we can expand and condense storage quickly by moving containers with the fork truck; you don't do that with fixed bins.

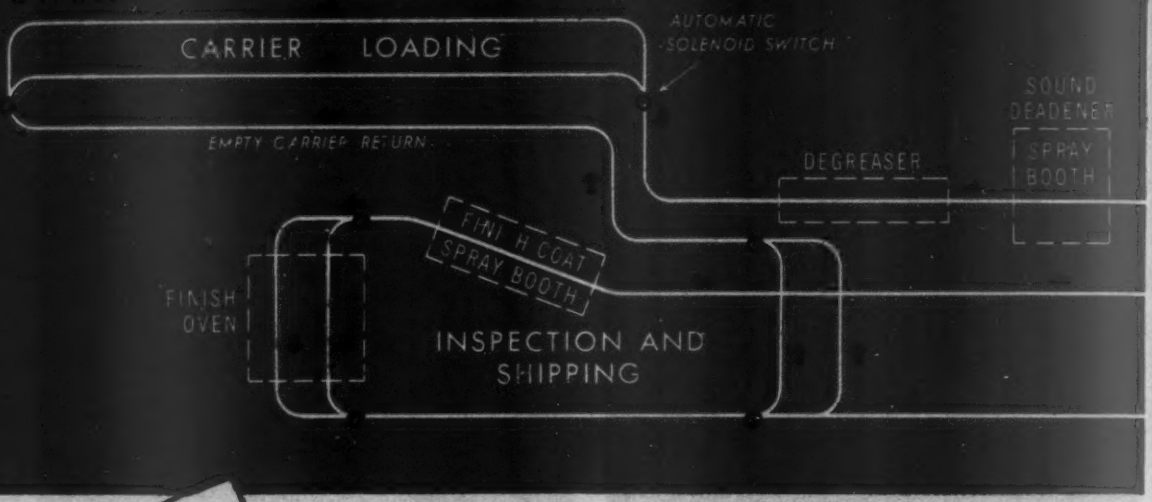
ANY "BUGS"? Yes. No matter how carefully you plan a new method, it seldom works perfectly the first day. But good planning does make the problems minor. Here is what I mean:

- We had to change towing hitches. First, our safety engineer made us cut back extensions on the dollies so people wouldn't bump their ankles. Then the ¾-in. carbon steel couplers bent under load, so we changed to ½-in. alloy steel.
- Hard rubber surfaces of the dolly wheels picked up bits of yarn, which wrapped around the axles, freezing the wheels. We eliminated "square wheels" by changing to wheels with good thread guards.
- Our first containers didn't have corner reinforcements. They tended to rack. Some soon began to look like the famous leaning tower. We corrected that by adding 12-gage sheetmetal angles to the corners.

REFINEMENTS • It's important to watch the new method closely for some time after it's installed—to make sure it works well. As we've studied ours, we not only corrected the minor problems, but also improved upon the original solution. For instance:

- We've started replacing homemade wood dollies with standard steel towing dollies that have 6-in. wheels.
- Newer containers are 35% lighter in weight, yet stronger. They're screw fastened and plastic coated to prevent snagging.

MORE USES • Our operating people took up this new method with enthusiasm, and suggested other uses for the containers. Some were good ideas; some were not economical. So far, we've extended use of the standard containers to one isolated process handling problem. Right now we're investigating application of the method to other materials in process.



Better Handling

MONORAIL SYSTEM is automatic through automatic processes. Between these processes carriers must be pushed by hand. There are 1500 car-

More Production in the

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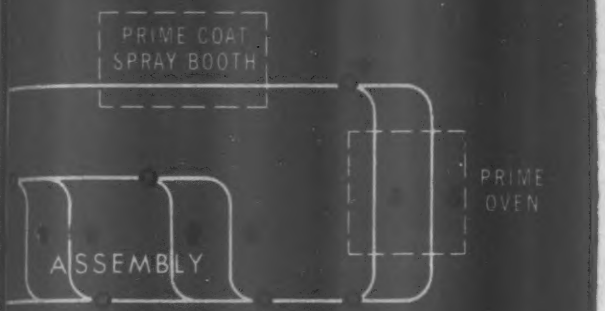


riers along the 3300 feet of track. The 90-in.-long carriers can support loads up to 500 pounds.

Same Space

By GEORGE H. CAHOON
Plant Engineer, The E. F. Hauserman Company
Cleveland

PROBLEM: *to increase production without enlarging building.*

SOLUTION: *Change from batch handling to cotinuous movement of parts with monorail system.*

BENEFITS: *Boosted production, but cut handling labor. Improved space utilization. Reduced material damage. Bettered working conditions. Improved production control.*

WHEN OUR COMPANY STARTED fabricating steel interiors for buildings, it was on a relatively small scale. So our handling system was primitive. Workers pushed floor trucks and racks loaded with parts through the several operations. But as production increased, handling became the big bottleneck. With the same push-and-pull system, we would have been forced to expand manufacturing space, use more men.

New and better handling methods were obviously needed. And we chose a monorail conveyor system as the best answer to our particular problem. It allowed us to increase capacity considerably without increasing space—with less handling labor. The monorail system handles the steel components from receipt of raw material, through finishing, to shipping.

Of course, we didn't get the ideal setup immediately. We've developed new details, from time to time, to improve it. I think that's important.

Today we have 3300 lineal feet of track in an area of 18,000 square feet, with 1500 carriers riding the rails. Carriers are 90 inches long. They hold loads up to 500 pounds. And are suspended at each end from swivel-mount trolleys. The system has 36 crossover double switches, 24 single-track switches, and 12 automatic switches.

HOW IT WORKS. We fabricate and finish a great variety of parts for metal partitions, in many sizes and shapes. Hanging the maximum number on each carrier with necessary surfaces exposed for finishing was our toughest problem. We licked that one by designing special hanging devices (hooks and racks) to take care of all types of parts. We standardized these devices to get the least number that would do the job efficiently.

Workers push loaded carriers throughout most of the system. We can't justify fully automatic movement, with our type of product and available area. But we did install some automatic equipment, where mechanization really pays off. For instance:

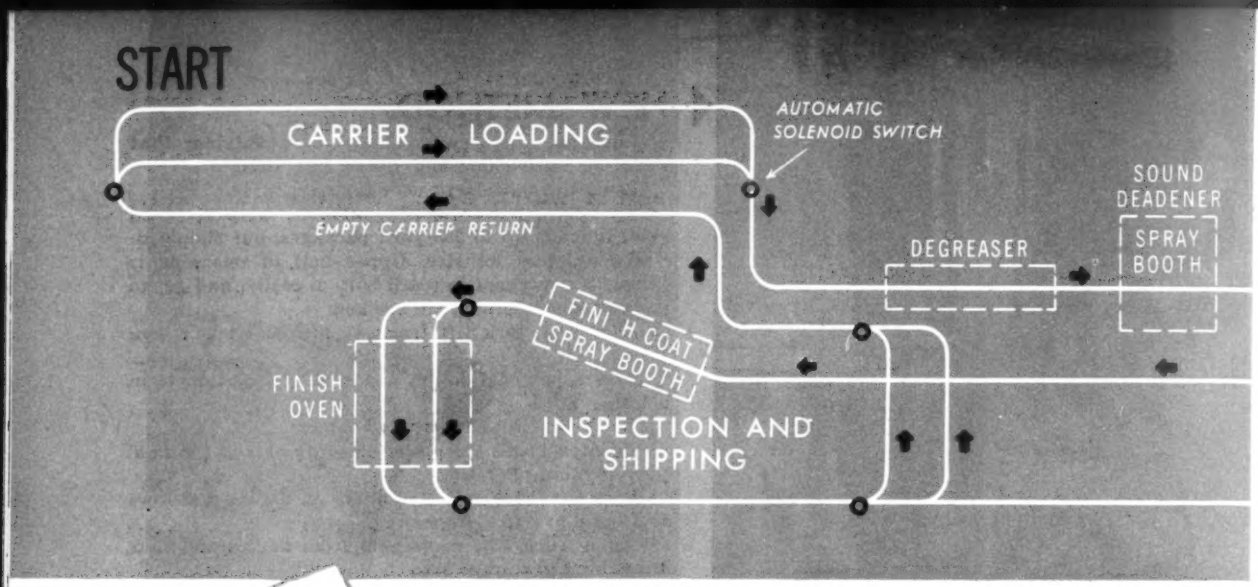
Automatic cleaning conveyor. An endless chain automatically takes carrier loads of parts through the vapor degreaser (4-stake pit type). It stops only to load and unload carriers; from there on it operates on a preset time cycle.

Automatic baking ovens. We change direction of travel of the carrier and its load to bake the prime coat, with a transfer mechanism we designed. After leading trolley passes a fixed point right ahead of the oven, a solenoid switch automatically shunts trailing trolley onto a second track. Loaded carrier passes through narrow oven door with its two trolleys on separate tracks. After entering oven, tracks curve 90 degrees and spread apart. Carrier swings broadside on swivel-mounted trolleys. That makes it possible to fully utilize oven space with just two tracks. Endless chain takes hold of each carrier and pulls it through oven at fixed speed. At the oven exit, tracks come close together and turn 90 degrees again, swinging carrier lengthwise. Another solenoid switch automatically puts both trolleys back on the same track.

Another mechanically controlled oven bakes the final coat of paint. This second oven has no doors; it has a heat trap instead. At the oven entrance, carriers swing broadside on two tracks in the same way they enter the first oven. Hooks on an endless chain, traveling at fixed speed, engage carriers and lift them from the tracks. Carriers move uphill, then down hill in this oven. Endless chain takes carriers up a sharp incline into the heat chamber at a higher level. At the exit end, the chain carries them down to floor level and drops them back on double tracks—still broadside. Another curved section of tracks and automatic switch puts them back on a single track.

Automatic elevator. We apply special coatings (such as wood-grain finishes) to some parts on the second floor. Carriers loaded with those parts are pushed off the main line onto a two-track bypass. An automatic elevator locks carriers on a movable section of tracks and lifts them to second floor. At upper limit carriers are automatically released to ride matching tracks to the process area. Carrier loads of finished parts return to the first floor by elevator.

Automatic carrier return. Carriers are finally unloaded at the shipping area. Workers transfer the empty carriers to an automatic return device. It lifts them high, then gives them a push to speed them down a gravity track to the point where they're reloaded. It's just like an extra-large model of the change carriers we used to see in department stores.



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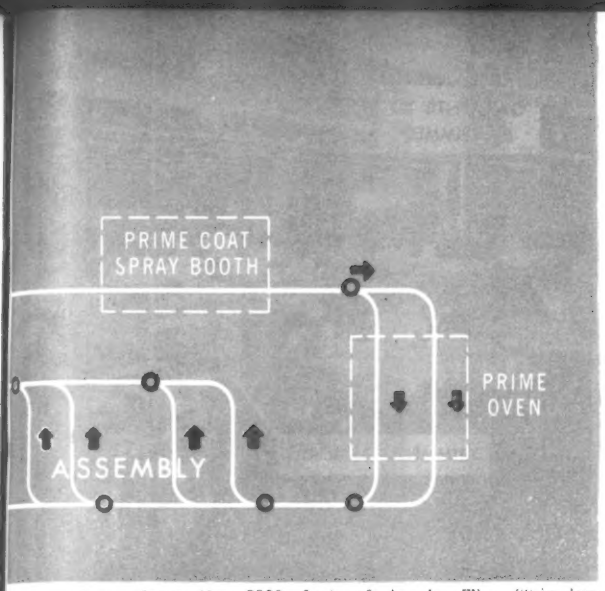

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Workers push loaded carriers throughout most of the system. We can't justify fully automatic movement, with our type of product and available area. But we did install some automatic equipment, where mechanization really pays off. For instance:

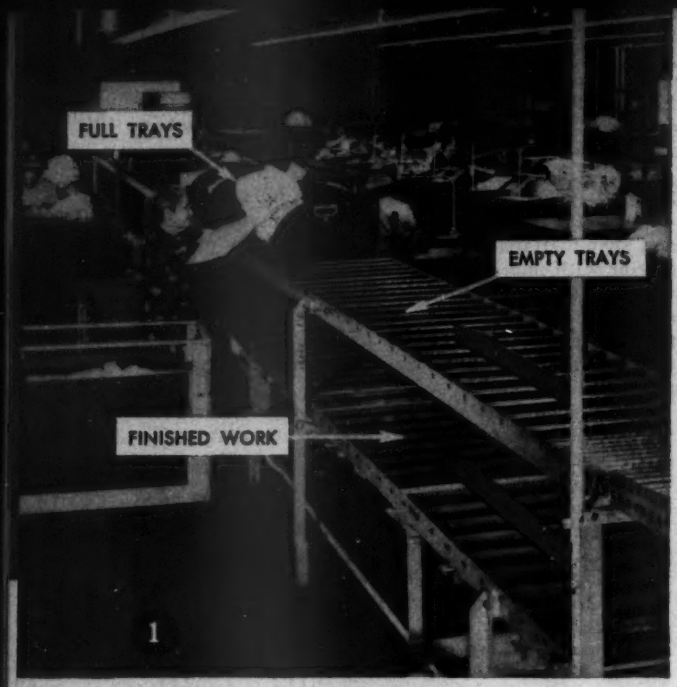
Automatic cleaning conveyor. An endless chain automatically takes carrier loads of parts through the vapor degreaser (4-stake pit type). It stops only to load and unload carriers; from there on it operates on a preset time cycle.

Automatic baking ovens. We change direction of travel of the carrier and its load to bake the prime coat, with a transfer mechanism we designed. After leading trolley passes a fixed point right ahead of the oven, a solenoid switch automatically shunts trailing trolley onto a second track. Loaded carrier passes through narrow oven door with its two trolleys on separate tracks. After entering oven, tracks curve 90 degrees and spread apart. Carrier swings broadside on swivel-mounted trolleys. That makes it possible to fully utilize oven space with just two tracks. Endless chain takes hold of each carrier and pulls it through oven at fixed speed. At the oven exit, tracks come close together and turn 90 degrees again, swinging carrier lengthwise. Another solenoid switch automatically puts both trolleys back on the same track.

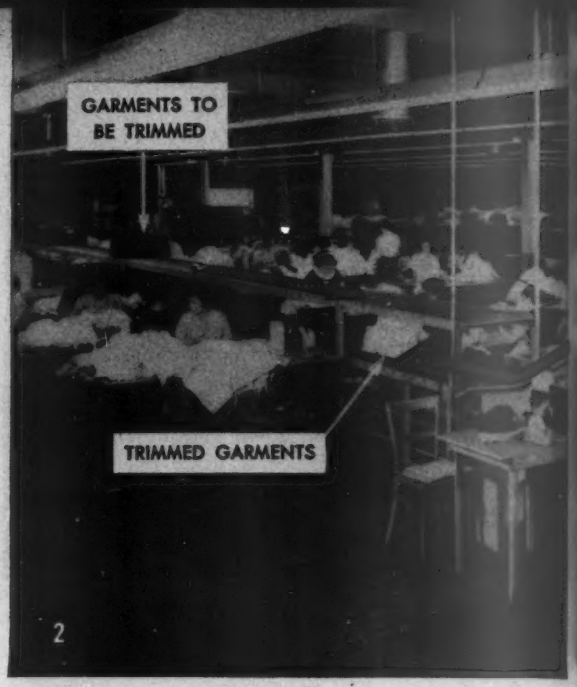
Another mechanically controlled oven bakes the final coat of paint. This second oven has no doors; it has a heat trap instead. At the oven entrance, carriers swing broadside on two tracks in the same way they enter the first oven. Hooks on an endless chain, traveling at fixed speed, engage carriers and lift them from the tracks. Carriers move uphill, then down hill in this oven. Endless chain takes carriers up a sharp incline into the heat chamber at a higher level. At the exit end, the chain carries them down to floor level and drops them back on double tracks—still broadside. Another curved section of tracks and automatic switch puts them back on a single track.

Automatic elevator. We apply special coatings (such as wood-grain finishes) to some parts on the second floor. Carriers loaded with those parts are pushed off the main line onto a two-track bypass. An automatic elevator locks carriers on a movable section of tracks and lifts them to second floor. At upper limit carriers are automatically released to ride matching tracks to the process area. Carrier loads of finished parts return to the first floor by elevator.

Automatic carrier return. Carriers are finally unloaded at the shipping area. Workers transfer the empty carriers to an automatic return device. It lifts them high, then gives them a push to speed them down a gravity track to the point where they're reloaded. It's just like an extra-large model of the change carriers we used to see in department stores.



DOUBLE DECK • Roller conveyors carry filled trays to operators, finished work to next operation.



DOUBLE AND SINGLE DECKS • Upper carries work to trimmers who put finished work on lower level. Inclined

Multideck Conveyors

By E. P. HESSER
Manager of Operations, The Formfit Company
Chicago

PROBLEM: *too many man-hours to handle garments by old methods.*

SOLUTION: *multilevel conveyors—gravity roller, belt-driven roller, and belt—to move garments through processing in lightweight trays.*

BENEFITS: *Eliminated materials movers between processes. Boosted output. Double- and triple-deck conveyors saved floor space. Speeded material flow, reducing in-process inventory. Cut rejections of soiled and damaged garments. Cut worker fatigue.*

NEARLY A THOUSAND FEET of conveyor serve our finishing operations in an area of just over 9000 square feet. We've been told that's "more conveyor per square foot than any other plant in the U.S.A." Maybe it is. Maybe it isn't. We don't care. But we *do* care about high production at low cost.

When we built our new Plaza plant in Chicago, we wanted operating economy. Experience in other plants taught us that materials handling was a big chunk of manufacturing cost. We studied methods—lots of hand trucking and individual handling of garment bundles. Then we let our imagination loose to hunt the "ideal" method for us.

We're sure of that because we know the Plaza plant can "lick the garments off" our other plants when it comes to handling. Here's why:

1. We eliminated labor required to move garments between finishing operations.

2. We boosted output. Cut handling time of productive operators. Kept material flowing to operators—there's no waiting for the next lot. Organized feeding material to operators to provide longest possible runs of the same type of garments. Eliminated confusion of material handlers chasing through operating area.

3. We compressed finishing into half the space normally required. At one point we move material in opposite directions—in a 2½-ft. aisle!

4. We reduced waste. There's little chance of garments getting soiled, damaged, or mixed, with our present simplified handling.

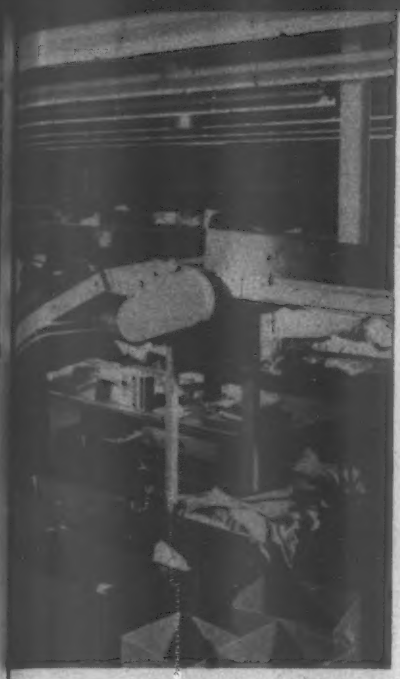
Our products—girdles and bras—run into hundreds of items, when you consider garment, style, size, and color. But, with minor exceptions, all go through the same finishing operations. Therefore, we can use a "straight-line" flow type of layout. That basic fact led us to adopt conveyors.

We can't just toss garments on a conveyor, though, because:

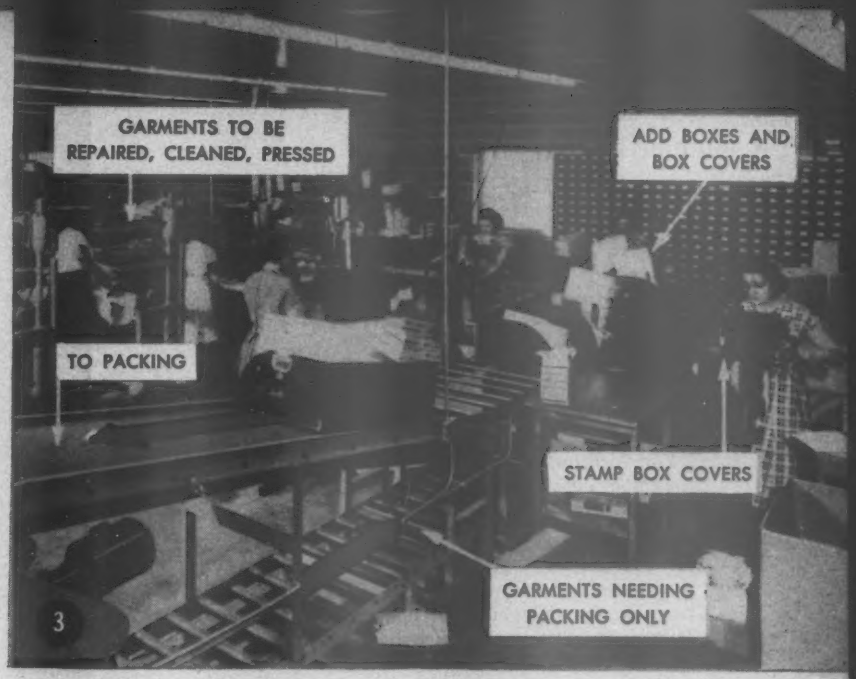
1. Hundreds of items mean small manufacturing lots. A "lot" makes a bundle of 2 dozen to 6 dozen garments, depending upon the type. Obviously, we have to keep them separated to prevent costly mixups.

2. Garments must be protected from soil and damage. So we added lightweight trays to the system to carry a bundle through the operations.

Turn the page for layout diagram and explanation of how the Formfit handling system works



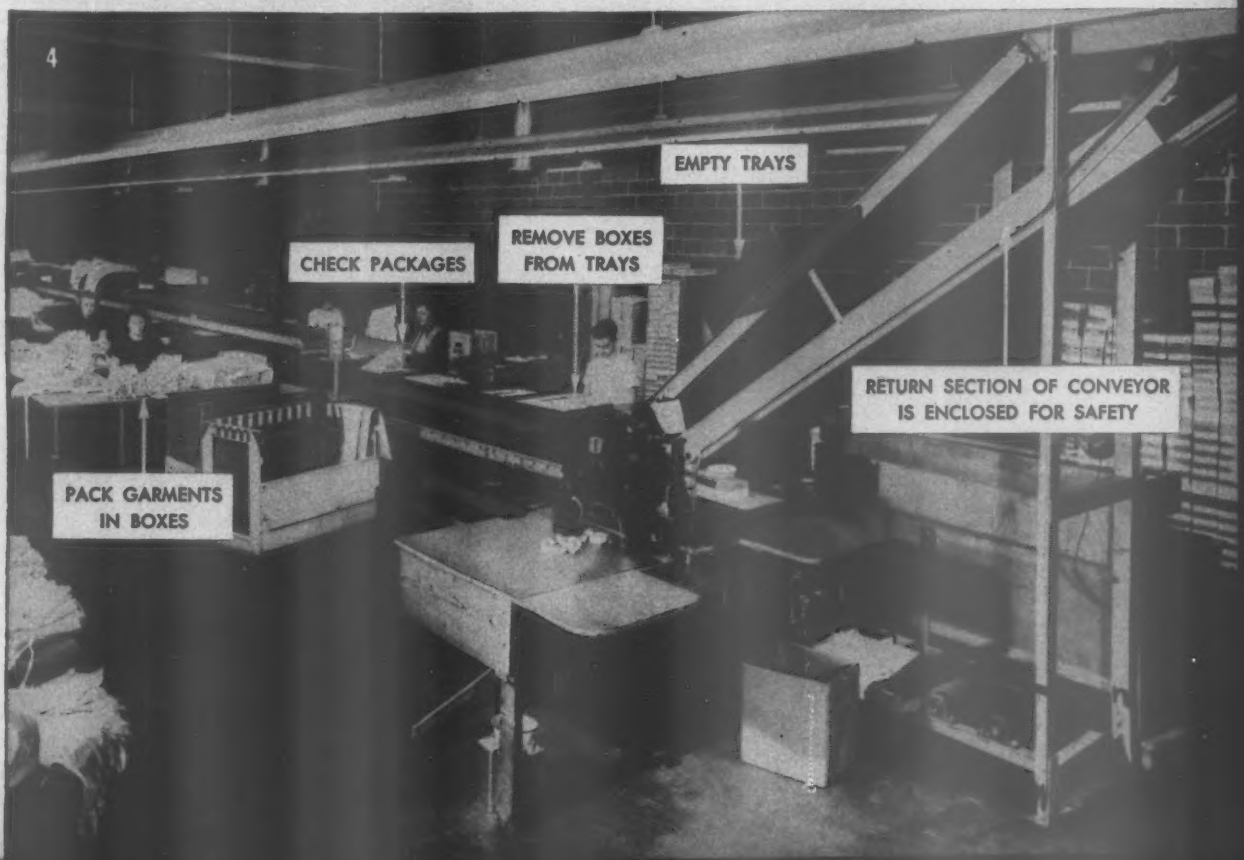
belt raises trays to gravity roller conveyor that moves trays to inspection.



DOUBLE DECK • Two levels keep work separated through several finishing operations. Inclined belt carries trays up and on to packing.

Multiply Our Output

TRIPLE DECK • Upper carries trays to packers who box garments, put trays on middle deck and push to checkers. Lower takes others back for boxes and packing. Inclined belt starts empties on another round.

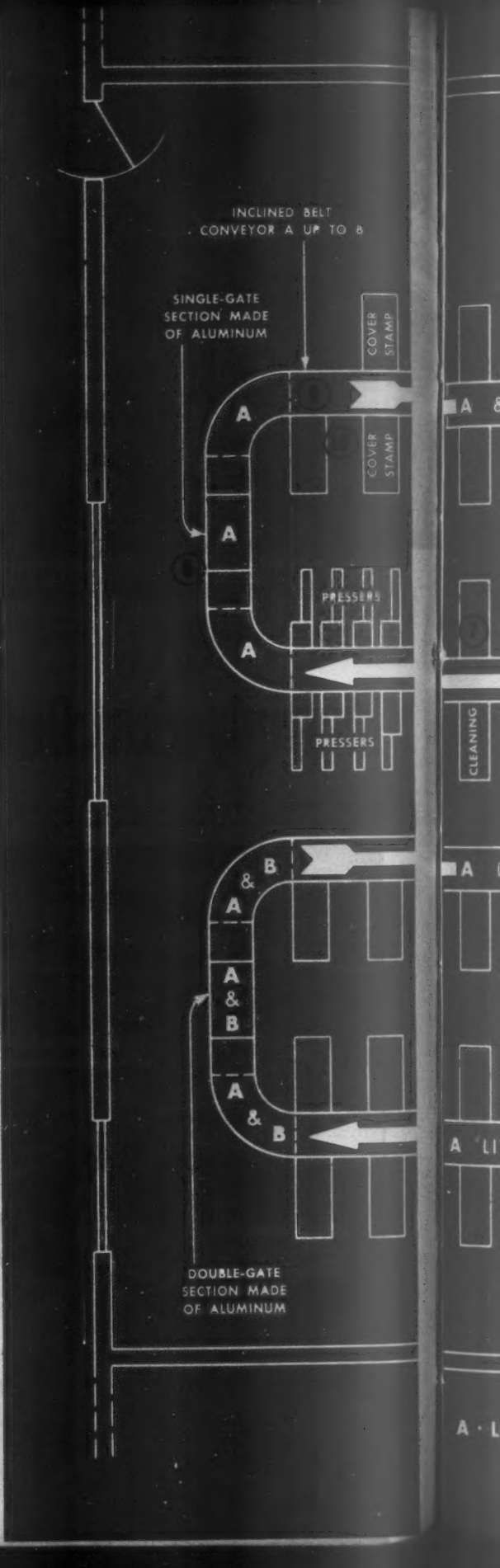


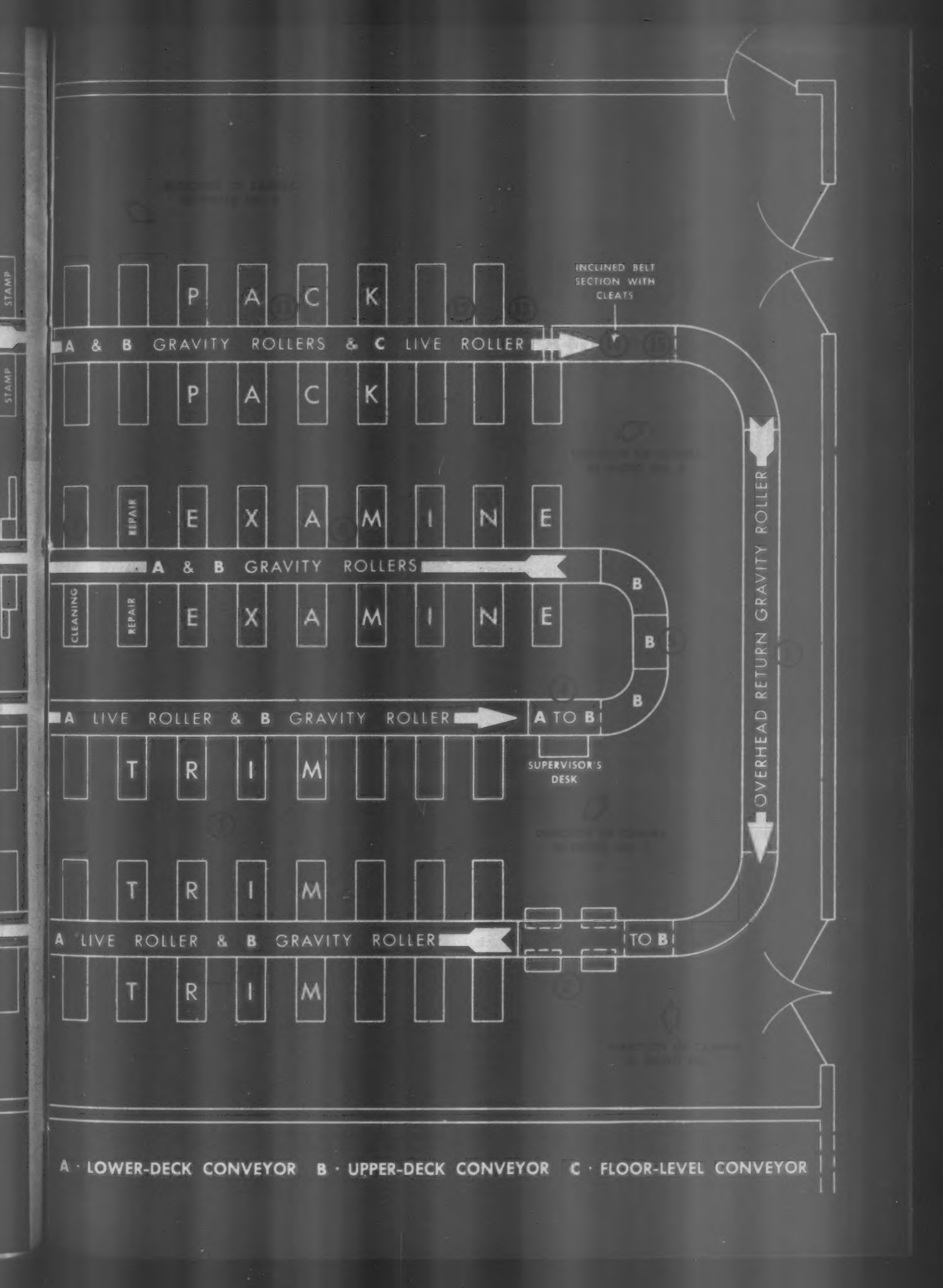
Multideck Conveyors...
begins on page 96

How Formfit Moves Girdles, Bras Through Finishing Operations

For location of operations compare item numbers with numerals on layout diagram.

1 Gravity roller conveyor carries empty trays back to starting point.
2 Worker transfers garments from floor trucks to trays—one bundle per tray. A light push moves trays on upper-level roller conveyor to trimmers.
3 Trimmers pull trays of garments from upper level. They put trimmed garments back in same trays, place trays on the lower level belt-driven roller conveyor.
4 Inclined belt conveyor takes trays from lower-level conveyor at end of trimming area. It carries them up to another gravity roller section.
5 Gravity roller conveyor coasts trays around 180-deg. curve. They slide to upper level of second two-level roller conveyor section.
6 Examiners take trays of trimmed garments from upper level and inspect them. If all garments in a bundle are OK, examiners replace them in tray and set tray on lower level. If any garments need repair or cleaning, examiners lay them on top of bundle in tray and set that tray back on upper level. Colored card signals what's needed. Occasional push keeps trays moving on both levels.
7 Repairers, cleaners, and pressers take trays from upper level, perform required work, place trays on lower level.
8 Workers add boxes and box covers to trays. They also add or take away garments, using stock at hand to balance the right number for each box.
9 Powered belt conveyor takes trays up to top level of three-deck roller-conveyor section.
10 Stampers mark box covers with quick-setting, treadle-operated machines, push trays to packers.
11 Packers take trays from top level, pack garments in boxes, place boxes back in trays. Then they set trays on middle level of conveyor and push them to checkers. Top level ends here.
12 First checker makes sure packages check with order and lifts tickets from trays for production records.
13 Second checker takes boxes from trays and stacks them on trucks for transfer to stockroom.
14 Second checker puts empty trays on inclined belt conveyor which takes them up to return gravity roller conveyor. Belt conveyor is cleated because it rises 5½ feet in 11½ feet.
15 Third-level belt-driven conveyor starts here. It carries trays of garments trimmed and examined by other Formfit plants to point where boxes are added. There operators lift trays to upper level and merge them with Plaza production.




STAMP
STAMP
P A C K
INCLINED BELT SECTION WITH CLEATS
A & B GRAVITY ROLLERS & C LIVE ROLLER
P A C K
REPAIR
E X A M I N E
A & B GRAVITY ROLLERS
CLEANING
REPAIR
E X A M I N E
B
B
B
A LIVE ROLLER & B GRAVITY ROLLER
A TO B
SUPERVISOR'S DESK
T R I M
OVERHEAD RETURN GRAVITY ROLLER
T R I M
A LIVE ROLLER & B GRAVITY ROLLER
TO B
T R I M
A · LOWER-DECK CONVEYOR B · UPPER-DECK CONVEYOR C · FLOOR-LEVEL CONVEYOR

Multideck Conveyors...
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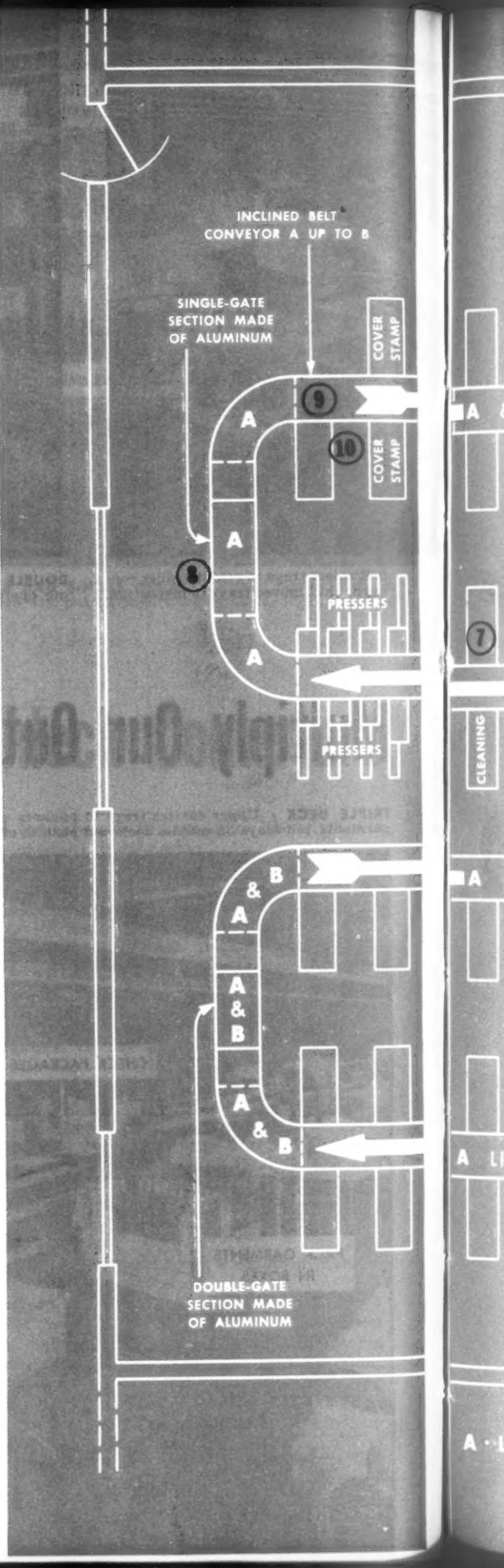
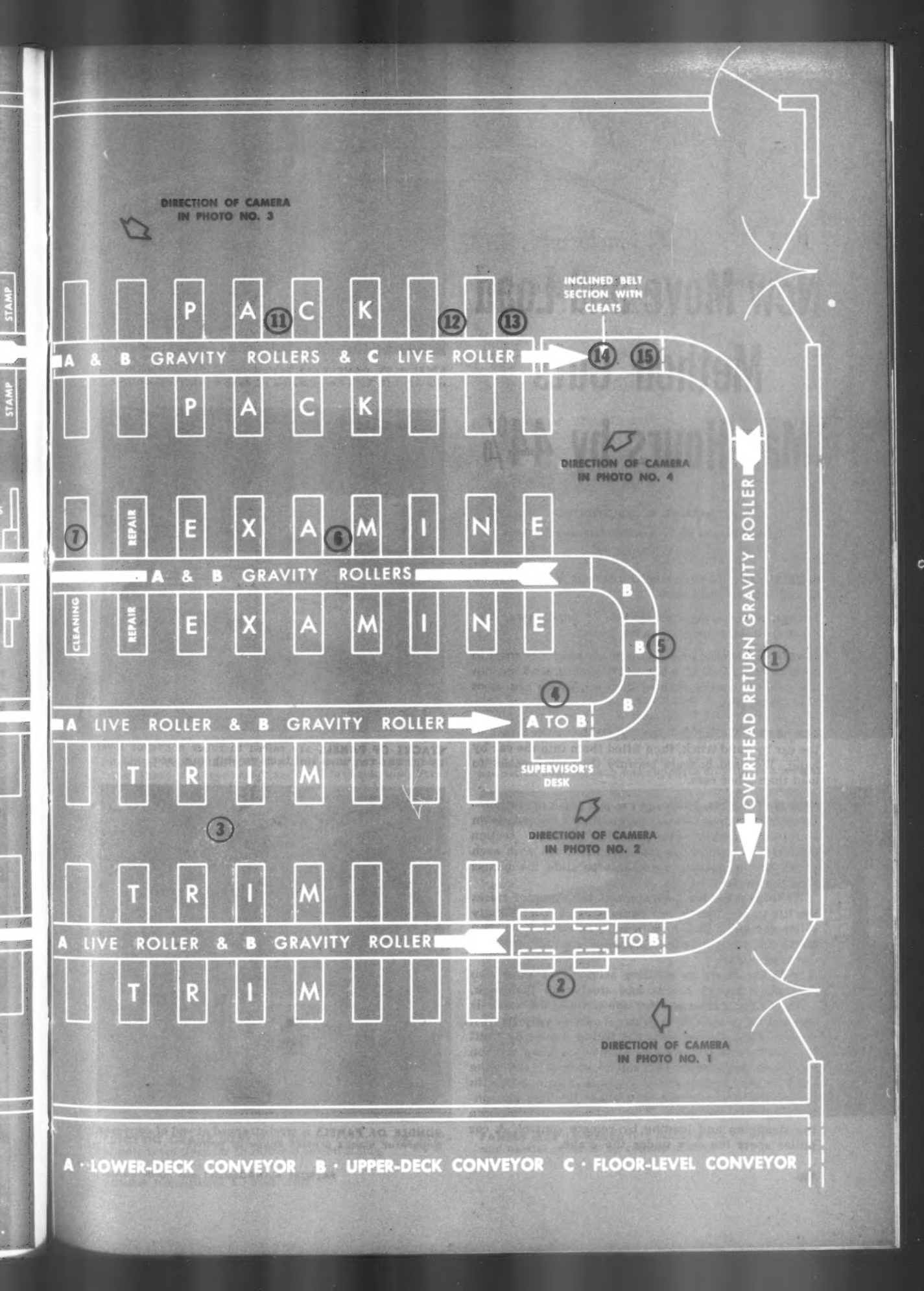



DIRECTION OF CAMERA IN PHOTO NO. 3
INCLINED BELT SECTION WITH CLEATS
P A C K
11
12
13
A & B GRAVITY ROLLERS & C LIVE ROLLER
14
15
P A C K
DIRECTION OF CAMERA IN PHOTO NO. 4
OVERHEAD RETURN GRAVITY ROLLER
1
7
REPAIR
E X A M I N E
6
A & B GRAVITY ROLLERS
B
CLEANING
REPAIR
E X A M I N E
B
5
B
4
A LIVE ROLLER & B GRAVITY ROLLER
A TO B
SUPERVISOR'S DESK
T R I M
3
DIRECTION OF CAMERA IN PHOTO NO. 2
T R I M
A LIVE ROLLER & B GRAVITY ROLLER
TO B
T R I M
2
DIRECTION OF CAMERA IN PHOTO NO. 1
A · LOWER-DECK CONVEYOR B · UPPER-DECK CONVEYOR C · FLOOR-LEVEL CONVEYOR

Better Handling

New Move-and-Load Method Cuts Man-Hours by 44%

By CHARLES G. GRUENDLING
Standard Railway Equipment Manufacturing Company
New Kensington, Pa.

PROBLEM: *to get heavy steel stampings from the press to and into railroad cars.*

SOLUTION: *an integrated system of positioners, conveyors, hoists, cranes, and a car puller.*

BENEFITS: *five men now do the work nine men used to do with less physical labor—44% saving. And we can use gondola cars instead of boxcars, which are often in short supply.*

OLD WAY • We hauled the panels from the press to the car by hand truck, then lifted them into the car by hand. We used boxcars because they were easier to load than other cars.

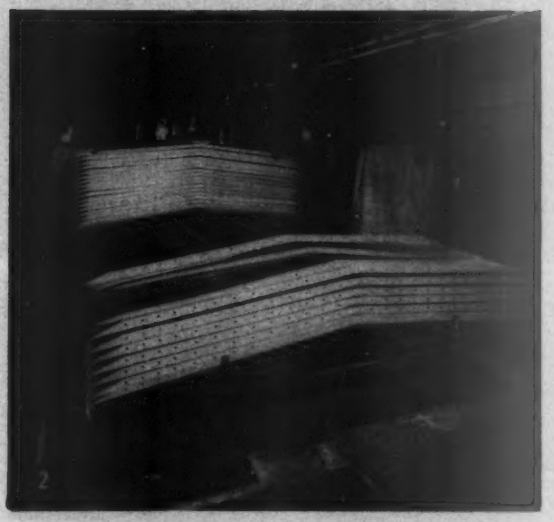
NEW WAY • Now, following the last press operation—forming the flanges—two operators nest the panels on a skid. The skid rides a roller conveyor section mounted on a hydraulic lift. The lift drops with each panel, so the operators are able to slide the panels onto the stack.

When panels have been stacked, the operator raises the lift to align with two sections of parallel gravity roller conveyor that form a twin runway. Two men guide the stack downhill. Slope is gradual, so stack can't run away.

With the stack on a tilting section, the same two men place spacer blocks and steel-strap the stack.

As further protection for the panels, the stack is shipped on its side so each panel carries only its own weight. First a hoist pulls the tilting device up until the stack rests edgewise to be loaded. Then a 3-ton electric crane, controlled from the ground, carries the stack to the gondola car. The crane is equipped with a specially designed rig that makes hooking and unhooking fast and easy. Also, crane moves between the strapping and loading by remote control. A car puller spots the cars under the crane.

STEEL CAR PANELS are nested on skid, resting on hydraulic lift. Lift keeps stack at easy work level.



STACKS OF PANELS are raised to roller conveyor level by lift and two men roll them to shipping area.

BUNDLE OF PANELS is steel-strapped at end of conveyor. Separator blocks protect shape of panels.

UPENDER TURNS BUNDLE of panels on edge, shifting load from short end conveyor sections to backstop. Fixed hoist, controlled by man at left, does the work. Panels are set on edge so each one supports only its own weight.

ELECTRIC CRANE, fitted with special carrying rig, takes bundle from upender to railroad car on siding.

PANELS ARE LOWERED into gondola car by crane. Crane and carrier go back by remote control.

NEW WAY • Unit load container (1) has diagonal inserts for strength. Filled (2), it holds 23 times as many

Better Handling

Bigger Unit Load Cuts

By K. I. OXENRIDER, Materials Handling Engineer
Construction Materials Department
General Electric Company, Bridgeport

PROBLEM: *to develop a better way to ship such products as range switches, molded parts, and refrigerator cord sets.*

SOLUTION: *unit loading in containers 40x48x24 inches, made of heavy corrugated board, to be shipped on expendable wood pallets.*

BENEFITS: *Handling costs cut 33%. Shipping costs cut 40%. Over-all costs cut 39%. New container holds 23 times as many cord sets as the old one.*

We chose refrigerator cord sets as the product on which to make our unit load tests—for two reasons. We ship over a million units a year. And we ship them to our own refrigerator division in Erie, Pa. Intra-company shipments gave us full opportunity to develop the packaging methods with trial shipments.

HOW WE WORKED OUT THE PACKAGE • The old way was to ship 35 refrigerator cords in a 17x15x8½-in. carton, made of 275-lb.-test double-walled corrugated board. Cartons were stacked by hand on double-faced pallets and moved by truck to loading platform.

Trucks or freight cars were loaded by hand, a carton at a time. At the other end, cartons were unloaded by hand, stacked on pallets, and moved by fork truck to the storage area.

First we designed a unit-load container, 40x48x24-inches. It was made of 350-lb.-test double-joined tube, with end caps. They were to be stacked on paper pallets. The dimensions let two unit loads set side by side in either a truck or a freight car. Depth is convenient for the worker who has to grasp that last cord in the container.

Paper pallets, 40x48 inches, were selected because of cost.

First Trial Run: Report and pictures of the first trial shipment were bad. The corners of the containers had burst. Contents were exposed. The paper pallets

cord sets as the old one did. Containers (3) are strapped to pallets for truck handling and stacking.

OLD WAY • Only 35 cord sets per carton, and the cartons had to be hand-loaded into trucks or railway cars.

Handling and Shipping Costs 39%

no longer looked like pallets. The samples had to be transferred to standard pallets at the Erie end. Collapse of the paper pallet caused the failure of the container. We decided on a more rigid pallet, to support the large, unbraced bearing surface of the container.

Second Trial Run: We switched to a stringer-type, expendable wood pallet. It offered greater rigidity, and was light in weight. The 5-stringer design prevented collapse of the pallet, even if one or two stringers were broken by rough handling.

But trial shipments again proved the unit loads weren't right. Corners and tops of the containers were crushed on receipt.

Third Trial Run: While the second trial shipment was being made, we learned that the Erie plant was receiving shipments from a near-by plant in plywood boxes. They were large sized, collapsed for economical return to the shipper. We got two, filled them with cord sets, strapped them to the expendable pallets, and shipped them to Erie. There were no mishaps.

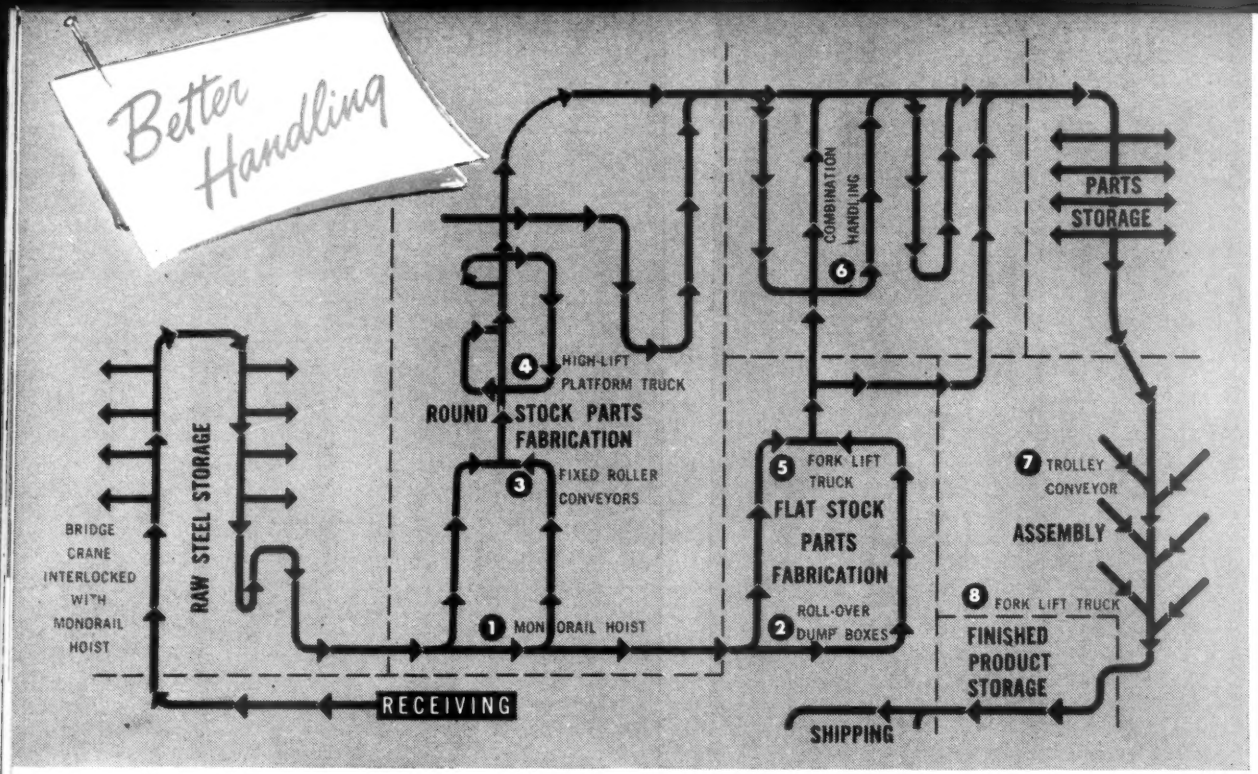
Although this method of shipping offered possible savings over the original method, we weren't sure it was the best possible. For one thing, the tare weight was 220 pounds.

Fourth Trial Run: Then diagonal or cross inserts to support corners and top were suggested. We made up sample containers with both types of inserts made of 200-lb.-test corrugated board. We shipped them on the expendable wood pallets, and waited for a report.

Although the tops had collapsed some, they weren't as badly crushed as earlier test shipments. Crush-resistance was important because the containers were to be stacked four-high in the Erie warehouse.

Fifth Trial Run: Success. Certain we were on the right track, we adopted the diagonal insert because it stood up better than the cross insert. The latter tended to fold over. But we changed to 350-lb.-test double-walled corrugated board to make the container support even greater weight.

Trial shipments, and many regular shipments since, proved this unit load would withstand handling and stacking to our complete satisfaction.



NEW LAYOUT • Integrating materials handling equipment with a new layout gives Jeffrey a smooth production setup in a job-lot operation. Numbers indicate points of key operations in the new production setup.

Making the Equipment Fit the Job

By **J. H. GARARD**, Industrial Engineer
The Jeffrey Manufacturing Company
Columbus

PROBLEM: *Obsolete handling methods jammed inadequate space, handicapped production efforts.*

SOLUTION: *Planned and installed better handling system, utilizing right equipment for each job.*

BENEFITS: *Slashed handling costs. Increased output of production machines. Freed floor space for production. Bettered working conditions. Lowered scrap losses. Reduced in-process inventories.*

OUR OLD CHAIN DIVISION was jammed with materials in various stages of fabrication. That caused delays.

We needed a new layout. That was plain. We've got it now. It's paying its way—fast.

Here's how we tackled our problem:

We planned production capacity. Our chain shop is job-lot operation, fabricating to customer's orders.

We may have as many as 250 orders in the shop at one time, in lots of a few pieces or a hundred thousand.

A planned capacity, based on a sales forecast, gave us the figures to plan number and type of production machines and equipment.

We chose a new location. The old shop had outgrown its allotted space in the plant. During its growth it was expedient to put up with long hauls and backtracking. Heat treating was done in a separate department.

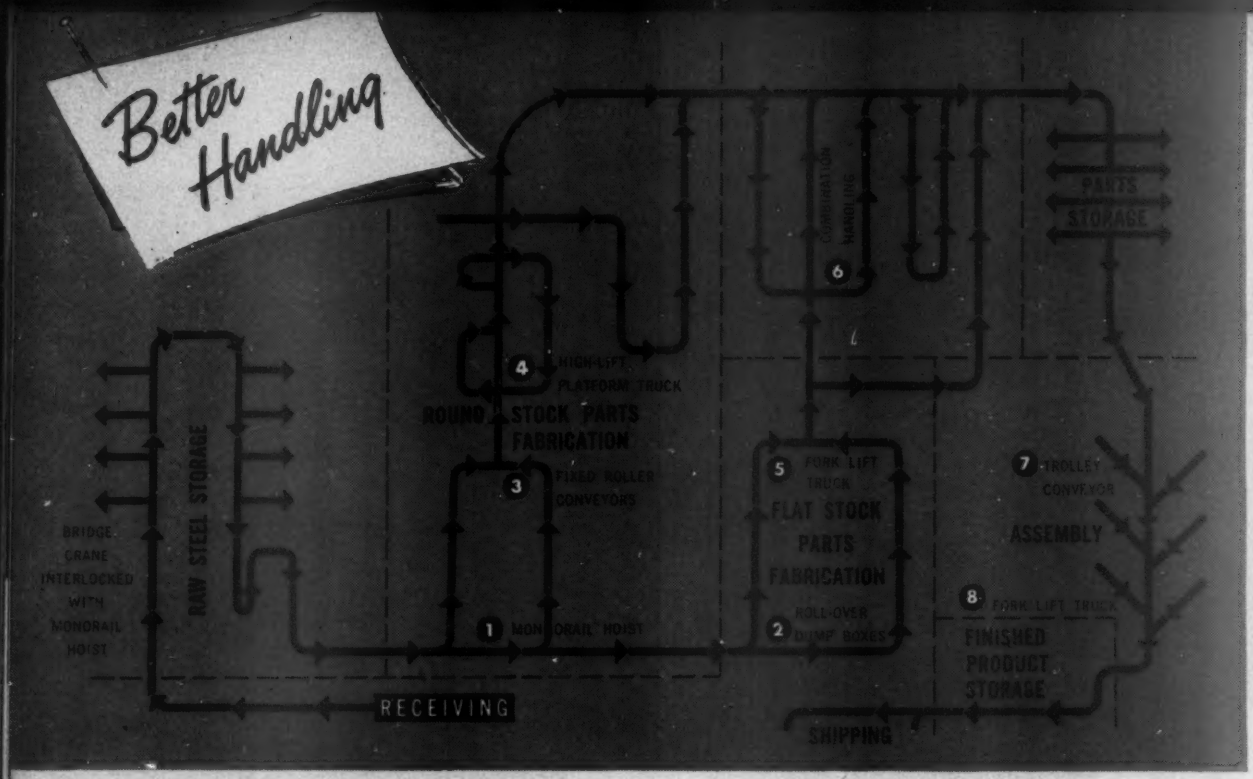
We made a production layout. We analyzed the routing of each part through the setup. There were similarities in general flow, even though parts were made in many sizes and styles. From the routings we made flow charts of the entire process.

The flow charts revealed some variations from the general flow pattern. We corrected as many of these as we could by revising routing of parts and manufacturing methods. The rest had to be tolerated.

We designed handling methods and equipment. Starting with raw steel handling, we picked equipment and methods for each move through the division. We also considered each handling operation in relation to all other handling of the same part. In that way we minimized the variety of equipment and standardized selected types. Handling was plotted on our layout diagrams.

We established production and handling rates to balance equipment requirements at maximum capacity. That's important if you want your system to work smoothly and efficiently.

We installed the plan. Adequate space for the higher production level became a necessity. Our plans were approved, construction started immediately, and the plan became a reality.



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1 **ELECTRIC HOIST** on monorail track, controlled from the floor, moves steel bar stock from temporary storage racks to machines as it's needed. A bridge crane carries bundles of steel from raw steel storage (see diagram opposite page) to temporary storage areas by way of interlocking tracks. Here's how the one piece of equipment does two jobs: The cab and hoist of the crane switch back and forth between the crane bridge and monorail tracks, connecting storage with receiving dock and parts fabrication. Operating on monorail track, crane picks up steel from receiving dock, transfers to the bridge inside the storage building. As a crane, then, it can place steel anywhere within runway boundaries. When steel is ordered by production, crane lifts bundles from storage and, without transferring load, shifts from bridge to monorail tracks that carry the crane to the fabrication areas.

2 **ROLL-OVER DUMP BOXES** carry flat stock parts through fabrication, from the time parts are cut from long bars to assembly. Containers are designed for optimum lot size of these parts, and convenient handling at the machines. The boxes have skids and lugs attached for handling with either fork lift truck or hoist.

3 **ROLLER CONVEYOR** moves nesting tote boxes of round stock parts through primary operations because the flow is nearly uniform. Containers for round stock parts are smaller because the parts are smaller.

4 **HIGH-LIFT PLATFORM TRUCK** moves tote boxes of round stock parts through secondary operations. Conveyor sections on the truck platforms make it easy to transfer tote boxes from one conveyor to another.

MAKING THE EQUIPMENT... begins on page 104

How Jeffrey Teams Trucks and Trolleys

5 **FORK LIFT TRUCK** moves dump boxes of flat stock parts through all the fabricating operations, delivers them to the heat treating department. Parts don't follow a uniform flow, so truck handling works best. Truck, equipped with revolving forks, slips forks into closed skids, lifts and dumps boxes of small parts into self-feeding hoppers at machines. Truck also takes away dump boxes of scrap collected at the machines.

6 **COMBINATION HANDLING** is used in the heat treating department to provide service for all processes. Nearly every type of chain division handling equipment is used here, including bridge crane, monorail conveyor, roller conveyor, platform and fork lift trucks. That's because both types of containers carry parts through a variety of processes, often return parts to fabrication. Lift truck (with the conveyor platforms) brings round stock parts to heat treating, places tote boxes on storage sections of roller conveyor. Fork lift truck delivers flat stock parts in roll-over dump boxes. Bridge crane handles roll-over dump boxes in temporary storage, places loaded self-feeding hoppers (see photo, right center). Monorail conveyor moves containers to and from some of the operations.

7 **TROLLEY CONVEYOR** picks up assembled chains in the assembly area, carries them automatically through oil dipping (rustproofing) to the conveyor unloading point. Continuous flow of product over this route makes a conveyor a natural selection. By using the overhead trolley conveyor valuable floor space is added to production. A floor-controlled jib crane, one for each pair of assembly benches, lifts and swings finished chains from bench to the trolley conveyor. Operator adjusts position of the load to transfer it from jib crane to a supporting hook on the trolley conveyor. Chains stay right on the conveyor as it dips them into oil tanks under dipping sections of track. When chains reach the unloading point operators pick them off the trolley conveyor with another jib crane. Chains are lowered onto pallets, sorted for shipment or storage.

8 **FORK LIFT TRUCK** carries palletized chain to finished product storage next to the spot where chains are removed from the trolley conveyor. Stacking loaded pallets saves a lot of floor space. Chains are shipped on pallets, too, either directly from production, or from storage. That makes it possible to load cars and trucks quickly.

CAN IT BE IMPROVED? *The variety of chains and small orders make true continuous flow impractical. But we think our system is pretty good for our conditions. And it has withstood the acid test of operation. Yet we're always looking for ideas to make it better. Now we're thinking of trying to develop more automatic handling at work stations.*

Faster Shipping—at 20% Less Cost

By R. M. SMITH, Chief Industrial Engineer
The Aluminum Cooking Utensil Company
New Kensington, Pa.

PROBLEM: *to package and ship 100% more specialty products—and overcome handicaps of jammed space, and shipping delays.*

SOLUTION: *Set the operation apart. Minimize handling with more efficient layout and equipment.*

BENEFITS: *Cut warehousing and shipping costs 20%. Speeded deliveries. Reduced mistakes. Curtailed claims for damaged products.*

OLD WAY • Here's how we used to pack and ship aluminum cooking utensils, before we adopted better materials handling:

The ware came from production lines in crates, or on pallets. One overworked elevator carried them up to the fifth-floor storage area. When ordered, products were moved out of storage and up, by elevator, to the sixth-floor working area.

We had something like an assembly line packing operation here. Workers, stationed along a gravity roller conveyor, packed the ware into shipping cartons as the cartons moved along the conveyor. Toward the end of the line cartons were sealed, labels attached, cartons weighed, and postage was determined and applied. At the very end of the line cartons were palletized to make larger unit loads. But here the flow was stopped to let paperwork catch up.

After manifest sheets were completed, we moved the pallet loads from the holding point to a ground level storage area, again by elevator. More delay, waiting for loading, then finally trucks took the pallet loads off to the local post office. At the post office, after getting through traffic delays, trucks had to be unloaded, of course.

That method had some good features, such as the packing line, but even that could stand improvement. Then higher output really emphasized the weak spots. Production jammed working and storage space, and the elevator. In short, we had a serious bottleneck.

Most of the production increase was specialty ware, marketed through many small distributors. That means a high number of orders per ton shipped. Nearly all shipments go out by parcel post, C.O.D. Fortunately, variety of orders is limited, so the packing problem is not complex.

NEW WAY • First thing we did was move. Although it was a quarter-mile from production, we moved packing and shipping to another building. We can do the job on three floors, saving vertical movement.

We still crate or palletize ware as it leaves production. Fork trucks load units into trailers that are hauled to enclosed dock in the warehouse and shipping building. Unloaded quickly by fork truck, unit loads are carried to second-floor storage area by a semi-automatic elevator.

We have two packing units—both on the second floor. The first line packs regular sets from crates into cartons. Packers, stationed along a constantly moving belt conveyor, put ware and packing into cartons as they move forward. An automatic machine seals top and bottom of the carton.

Cartons move from sealer to a switching section of conveyor by gravity. Direct shipments are switched one way, stock another:

1. *Direct shipments get a short boost via inclined belt to a roller conveyor.* It carries them past stations where labels and postage are applied, and into a spiral chute which lowers packages to the first floor.

2. *Stock sets are diverted to a pushbar conveyor which carries them up to the third floor.* Workers palletize packages as they come from the second floor and fork trucks stack unit loads in storage. When sets are shipped from stock, they're labeled and stamped along a third-floor roller conveyor, then spiral-chuted to the first floor.

The second packing line handles small miscellaneous orders. Workers assemble orders from adjacent stock and hand-truck them to a packing table. Packers place filled cartons on a belt conveyor which takes them to operators who apply labels and postage. A combination of belt and roller conveyors picks up packages and carries them past a postage meter. Operator spiral-chutes packages to first floor—small ones by one spiral and large ones by another.

A third group of items are stocked on the third floor where they're prepared for shipment when ordered. Spiral chute lowers them to the first floor.

We moved the post office. All those spiral chutes to the first floor end right in a branch post office. We ship enough by parcel post to support this branch, which we equipped and maintain. Employees of the local post office operate it.

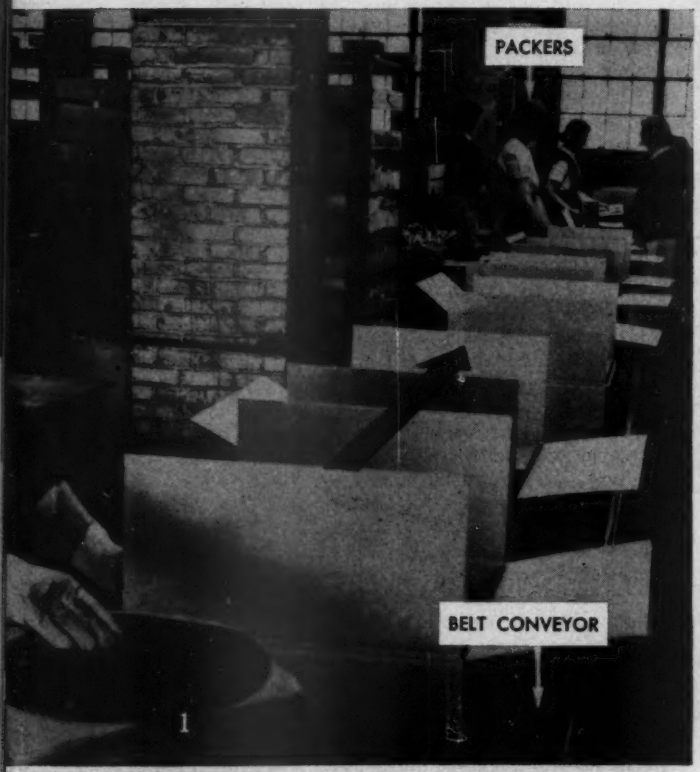
All the packages emerge from the spiral chutes onto gravity roller conveyors. Post office employees sort and cancel packages as they move over a system of conveyors. Small packages are put into mail bags and trucked to postal railway cars. Large cartons leave the post office on a belt conveyor. It takes them up and around a 90-deg. curve until they're riding alongside postal railway cars on the siding.

Cartons are automatically guided off the belt conveyor into a chute. Five chutes feed into five cars with different destinations.

For picture story of new handling system at Aluminum Cooking Utensil Company, turn the page.

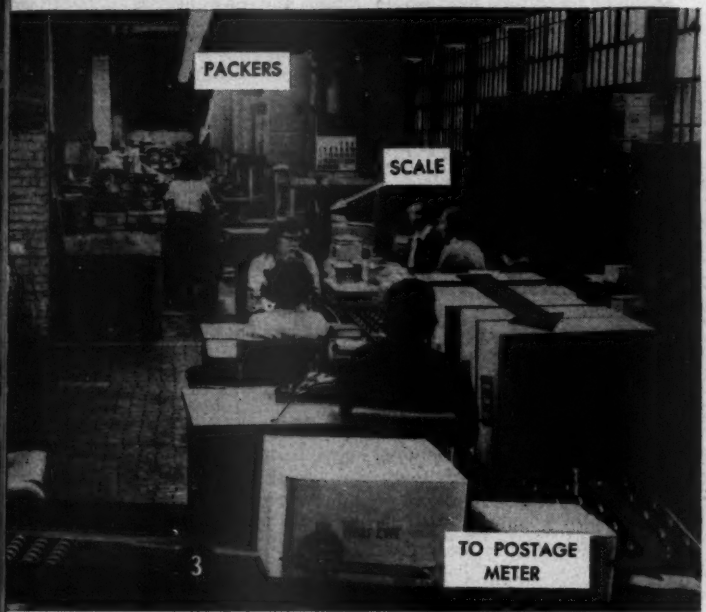
FASTER SHIPPING . . . begins on page 107

How Aluminum Cooking Utensil Co. Packs and Ships Ware

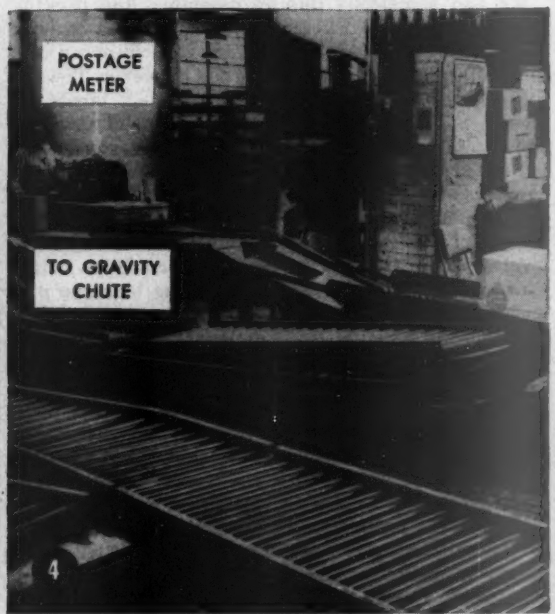


MAIN PACKING LINE packs sets of ware into shipping cartons as they ride a conveyor belt past packers to . . .

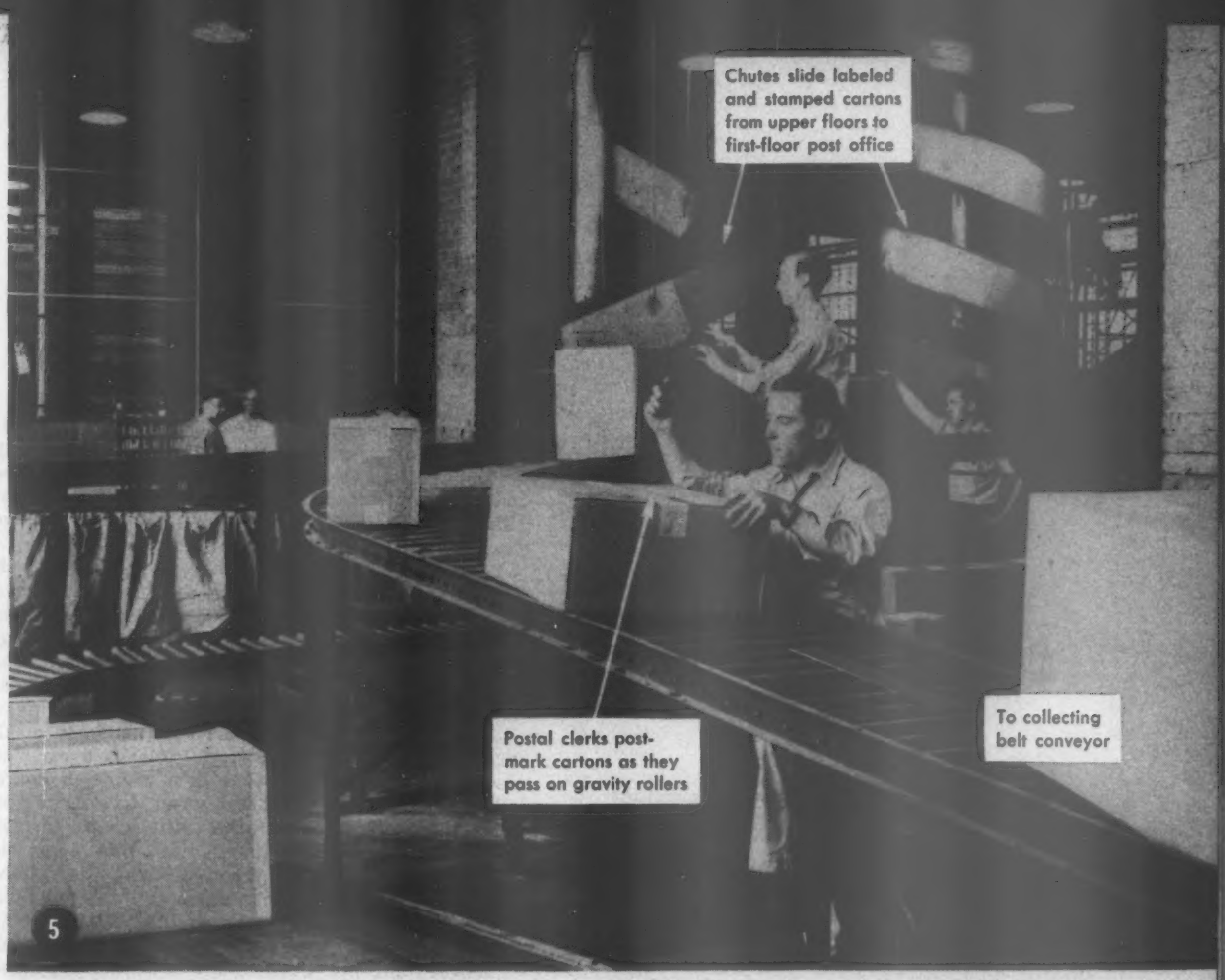
. . . **END OF PACKING LINE,** where switching section sends cartons either to shipping section or to storage.



MISCELLANEOUS PACKING LINE assembles odd lots into cartons. At end of line, conveyor moves cartons to . . .



. . . **BELT AND ROLLER CONVEYORS** that carry labeled cartons past postage meter to a gravity chute.


Chutes slide labeled and stamped cartons from upper floors to first-floor post office
Postal clerks post-mark cartons as they pass on gravity rollers
To collecting belt conveyor
5

POST OFFICE on first floor receives cartons by chutes from second and third floors. Chutes ease cartons onto gravity roller conveyors. Postal clerks postmark the cartons right on the conveyor. Then they roll to . . .

Belt conveyor collects cartons from post office
Chutes lower cartons into railway car
TO CAR
Remote-controlled relay starts guide to push cartons off belt into chute
6

. . . **BELT CONVEYOR** that collects cartons from the post office and carries them overhead along a 5-car railroad siding. Remote destination control sets guides to push cartons off belt, into chutes, and into the right car.

We Keep Production on the Move

By P. L. CLARK • Superintendent of Maintenance
Bridgeport Brass Company
Bridgeport, Conn.

PROBLEM: *to handle a variety of material forms along different paths of processing—inside, outside, and between buildings.*

SOLUTION: *Supplement fixed handling equipment with industrial trucks.*

BENEFITS: *Increased production. Cut handling labor costs. Lowered in-process inventories. And improved working conditions.*

WE'VE LEARNED that better materials handling means higher production. That's because better handling can feed more material, more conveniently, more speedily to processing. Because, too, better handling keeps production cleared away from processing—eliminates bottlenecks.

Our plant has hundreds of individual machines and processes that range widely in size, purpose, and production rate. They work on materials in a wide variety of sizes, weights, forms, and temperatures. Operations are scattered over several buildings. Many materials do not move regularly in a fixed flow pattern. All these variables add up to a complex job of materials handling. But mechanical handling simplifies the job—does it faster, at lower cost.

We use all types of handling equipment, including cranes, conveyors, hoists, positioners, platform trucks, and fork lift trucks—whatever does a particular job best. But, because of the variety of conditions I mentioned, we rely heavily on our truck fleet to keep production moving. We're continually finding new ways for the trucks to cut manual handling. Some of the better handling jobs they do are described in the text that follows.

Get raw materials into production. Raw materials arrive in bulk and unit loads; fork trucks handle all. Except for bulk brass scrap (such as turnings), we make up unit loads as we unload—if they're not shipped in units. Of course, we'd prefer to receive them in unit loads, but it isn't always possible.

Lead, zinc, and tin pigs make easy-to-handle, self-skidded unit loads. When they're loose in the car, unloaders stack them into units and strap them. From there on, fork trucks handle them through storage to the point where charges are assembled for the furnaces. The man-hours spent making unit loads are saved many times over in subsequent handling.

Electrolytic copper slabs arrive usually in steel-strapped bundles. A fork truck unloads a car and stacks the bundles in storage in a couple of hours.

We use a lot of bulk brass scrap, too—chips and small pieces. Trucks equipped with scoops, instead of forks, unload scrap quickly into bins alongside the unloading platform. When the scrap is needed for furnace charges, trucks scoop it into weigh-out (tote) boxes for fork-truck handling to the scrap room. I remember when we had a big labor gang to shovel scrap into buggies and haul them by hand from the cars to storage.

Preparation of extrusion billets. Just because pieces are heavy doesn't mean you can't handle them on pallets. For instance, let's take extrusion billets.

Cranes load round brass billets on husky steel pallets, then lower pallets from casting floor through hatchways to ground level. Fork trucks pick up loaded pallets and take them to temporary storage or directly to saws. Eventually all go to the saws, which are in another building.

At the saws, a fork truck lifts pallet load up over feeding table, then lowers pallet between two parallel rails running downgrade away from truck. Billets overhang pallet and are caught on rails, rolling down to saw. Pallet drops between rails and fork truck withdraws it and stacks it near by. When stack of empty pallets reaches load size, fork truck returns them to the hatchway.

Saw cuts billets into ordered lengths for extrusion and piles them on other steel pallets. Fork truck removes loaded pallet and sets in empty pallet. Then the truck moves the pallet of billets under a hatchway to be lifted to extrusion press by crane.

Saw operator slides scrap ends into a steel tote box. Fork truck takes filled boxes to scrap room.

Turn the page to see how Bridgeport Brass does rod-mill and sheet-mill finishing and maintains its fork trucks.

PRODUCTION ON THE MOVE ... begins on page 110

How Bridgeport Brass Uses Fork Trucks

ROD-MILL FINISHING. When brass rod hits finishing, it goes in several directions—to different wire-drawing machines and processes, even to other buildings. Here, again, fork trucks keep material moving as fast as processing can take it. The flexibility and versatility advantages of the fork trucks show up when you get volume surges and unusual handling jobs.

We have what we think is a clever way of handling coils of wire for our conditions. Coils are strung on a long flexible strap with a hole at each end, as they come off drawing machines. Lift trucks are fitted with a truck-width horizontal bar, with two hooks dangling on short chains from either end of the bar. To move a bundle of coils, truck operator lowers the bar over the bundle and worker simply inserts hooks into holes in the strap. Then the truck operator raises the load and takes it away.

SHEET-MILL FINISHING. Brass sheet and strip get a variety of treatments, in accordance with each customer's order. There's coil slitting, sheet shearing, circle cutting, flattening, annealing, and brushing, to name some. The average order is not big either. So each ton shipped must be handled many times in this area, in digressive patterns of flow. Cranes handle most of the long hauls, but there's a limit to the number of cranes you can put on a single runway.

Material is put on skids. Platform trucks move skids from process to process, and finally carry orders to shipping. Truck operators, assigned by foreman, see that machines are supplied with orders and take away completed work.

Scrap is segregated by type of alloy and collected in tote boxes at each machine. Trucks take identified scrap to scrap room for reuse.

BEHIND THE SCENE. To do this job without production delays, here are the factors you've got to watch:

1. Have enough trucks. A truck delay is cheaper than a production delay; sometimes it's only a fraction of production cost. We assign trucks to operations as requested by department heads; they're responsible for both production and handling costs.

2. Assign truck operators definite responsibilities for servicing production. That eliminates buck-passing when a delay shows up.

3. Keep trucks in good operating condition. We get a daily report from each operator describing truck condition. If there's anything wrong we get right after it. We take care of unpredictable breakdowns with fast service procedures, such as substituting a spare dispatching mechanic to the scene, and changing engines.

4. Select operators carefully; train them well. Our safety department gives applicants knowledge, visual, and operating tests. Apprentices are trained by supervisors to operate trucks correctly.

TIPS TO GOOD HUMAN RELATIONS for factory executives

HOW TO IMPROVE EMPLOYEE MAGAZINES Want to find out where you stand on your employee magazine? The Dartnell Corporation has a lot of the answers in their recently published survey of more than 400 company publications. Title: *Improving the Content of the Employee Magazine.* It's bulky (142 8½x11 pages) and expensive ($9.50 a copy). But if you think your magazine needs improving—who doesn't?—you may get some real help from it. Dartnell's address: 4660 Ravenswood Avenue, Chicago 40.

PERSONAL TOUCH IN PERSONNEL HANDBOOKS It's a big job to get employees to read personnel handbooks. One way to improve readership is to get personal. That's what Philip Morris & Company does in *The House That You Built*—its personnel handbook that tells about benefit plans. First thing the company does is to delay giving out the handbook till an employee has been on the payroll three months. Then it's given to the employee in a handsome simulated leather binding on which his name is stamped in gold. In back, there's a pocket that holds insurance policies and benefit plan certificates.

One reason for the personalized cover is to get the employee to take the handbook home. That increases the chance that family and friends will also read it.

WATCH THE QUESTIONS YOU ASK Ask the right questions, or you'll get wrong answers. That's a good rule to follow when you're trying to find out what top management men think about your human relations programs.

A good example of just what this means comes from Pitney-Bowes, Inc., Stamford, Conn. The company ran a series of basic human relations conferences for all members of management. It was apparently very well received, but they decided to make a more formal check by asking the 170 men who attended to fill out a questionnaire.

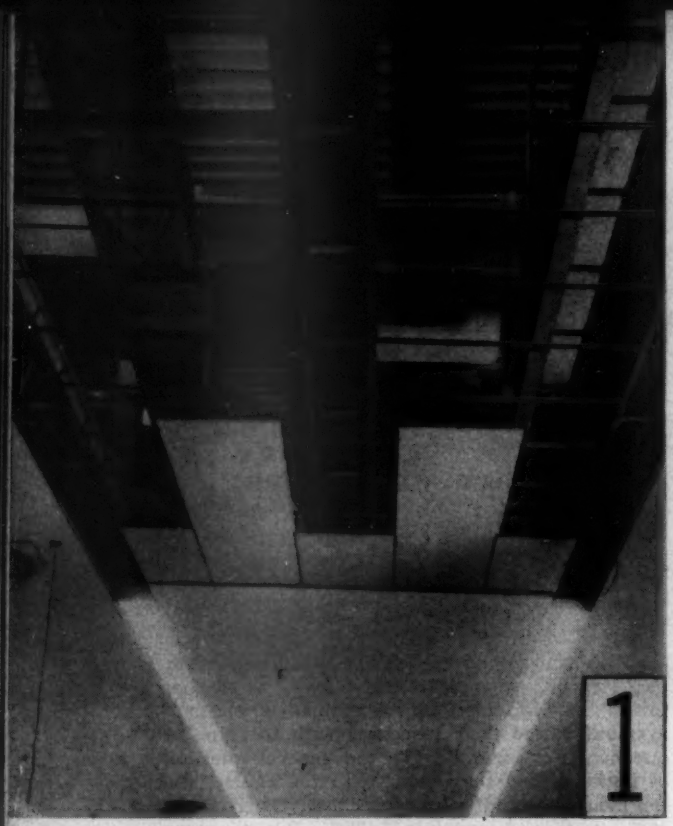
The results were revealing. They showed that the 20 men who make up the company's top management varied their responses with the type of question. For example: To the general question of how satisfied they were with the course, the top men answered "very well" 35%, "fairly well" 40%, "rather disappointed" 25%. But to more specific questions, the favorable response ran up to 75% and 80% regularly. When asked whether the course stimulated their thinking about human relations problems, the answers ran 75% "very stimulating" and only 5% "not very stimulating." And 80% asked for a follow-up course.

Moral: Don't be content with the first generalization you hear. Get specific.

HOW GOOD ARE EXPERIENCED INTERVIEWERS? Not so good, is the answer given by the University of Wisconsin's Bureau of Industrial Psychology. In fact, says Prof. Karl U. Smith, "experience in interviewing generally leads the interviewer to a point where he is less—not more—capable of predicting human behavior."

Smith reached his conclusions as the result of a research project in Ansul Chemical Company, Marinette, Wis. A group of Wisconsin University psychologists interviewed 200 Ansul employees to find out what they thought of the company and how satisfied they were with their jobs. The psychologist's conclusions were then compared with the employees' own opinions, and with the results of questionnaires the employees had filled out.

The psychologists with the least interviewing experience agree most closely with the employees' own opinions and questionnaires. Interestingly, a similar study by the University of Michigan has shown the same results. Such studies suggest that you needn't worry about lack of experience for interviewing and evaluating employees. Just be sure you keep in close touch with their common problems and everyday working and living conditions. That seems to be the most important requirement.



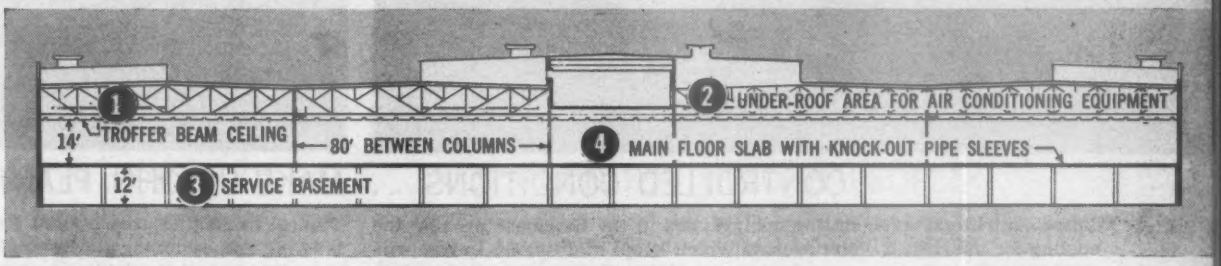
TROFFER BEAM CEILING • Deep "troffer beams" of heavy-gage sheet steel are fastened to trusses. Lighting units are already installed in two of them. The one in the center will be blocked off, can be used later if more light is needed. Beams also support air conditioning duct, air diffusers, sprinkler pipes.

UNDER-ROOF PLATFORMS • There are 29 air conditioning platforms—like this one—between ceiling and roof. Each platform carries the equipment necessary to maintain the particular combination of humidity, temperature, and other atmospheric controls required in the manufacturing zone it serves.

SERVICE BASEMENT • For ease of installation and maintenance, more than 1000 tons of piping has been suspended from the main floor slab in five carefully planned levels. Piping includes steam and condensate, air, gas, vacuum, hot and cold water, and sprinkler lines. Basement runs under entire production area.

KNOCK-OUT PIPE SLEEVES • All piping and conduit are brought up in short lines from the basement through the first-floor slab. Some 25,000 knock-out pipe sleeves (see arrow) make it possible to rearrange or install additional equipment without creating any disturbance or dirt on the manufacturing floor.

NEW ONE-STORY PHARMACEUTICAL PLANT, built for The Upjohn Company by the Austin Company, occupies a 1500-acre site just 15 minutes from downtown Kalamazoo, Mich. Exterior is buff face brick with limestone trim. Daylight is admitted to offices through a narrow vision strip with fixed "eyebrow."



PLANT CROSS-SECTION shows structural details of the new Upjohn plant. Numbers in the sketch are keyed to the photographs on the opposite page. This sketch (not to scale) shows only the manufacturing building. It is flanked by warehouses—one for receiving, the other for shipping. Both can be enlarged.

←FOUR UNUSUAL FEATURES MAKE UPJOHN'S BRAND NEW PLANT...

...Easy to Use, Easy to Maintain

PLANT OF THE YEAR. That's what some of the people who have seen the Upjohn Company's new controlled-conditions plant are naming it.

Why? See pictures on facing page. They show:

1. Its suspended ceiling. Troffer beams support not only fluorescent lighting units and acoustical tile, but also—between ceiling and roof—all air conditioning ducts, air diffusers, and sprinkler pipes.

2. Its under-roof platforms. There are 29, all supported by the welded H-beam roof trusses. Each platform carries the equipment needed to maintain the special atmospheric conditions required in the manufacturing zone it serves.

3. Its service basement. There is no piping in manufacturing areas. It is all suspended from the main floor slab—for ease of maintenance.

4. Its knock-out pipe sleeves. Approximately 25,000 of them were set in place before the main floor slab was poured. With them it is possible to bring up all piping and conduit in short runs to production equipment. Changes in plant layout can be made, or new equipment can be installed, without the necessity of tearing up the floor.

These things all add up to a plant that's "easy to use and easy to maintain."

PROGRESSIVE FLOW • The manufacturing area is flanked by large raw-material and finished-goods warehouses. Each has an enclosed railroad siding. Each has numerous truck loading docks. This arrangement provides for progressive flow of goods in process. It permits maximum efficient use of modern materials handling equipment.

FUTURE EXPANSION • Floor area in the new plant is approximately 40% greater than in the old buildings in downtown Kalamazoo. And the present layout provides for a further increase of 50% or more in floor area—if such increase is needed.

To see why the new plant is good for Upjohn products, good for Upjohn people . . . turn the page ▶

EASY TO USE, EASY TO MAINTAIN ... begins on page 114

CONTROLLED CONDITIONS ...

Three centrifugal refrigerating compressors in the basement provide the cooling for the chilled water system, which keeps atmosphere in the principal manufacturing areas at 75 degrees dry bulb temperature and 40% relative humidity. These compressors have a cooling effect equivalent to approximately 950 tons per hour.

MAKE UPJOHN PLANT

Typical packaging area is used for labeling and cartoning sterile products. Because of the need to maintain precise control in so many different departments, there are

GOOD FOR PRODUCT · Because of the wide range of operating conditions in the new Upjohn plant at Kalamazoo, Mich., 120 separate air conditioning systems are required. There are 75 in the manufacturing building. Some are highly complex units in which ultra-violet germicidal lamps, chemical dehumidifiers, and electrostatic precipitators have been combined with basic equipment to meet the demand for absolutely sterile conditions. Some are simple comfort cooling units.

GOOD FOR PEOPLE · Employee comfort was, in fact, uppermost in the minds of those who planned the plant. Because of its outlying location, special attention had to be given to employee transportation. More than eight acres of paved parking space has been provided adjacent to employee entrances. Employees who depend on buses alight in a covered concourse on the lower level, at the head of a 20-ft. corridor that extends the full length of the plant.

Personnel offices, employee locker and toilet rooms, and three large lunchrooms are located along the 1125-ft. length of this corridor.

All food served in the corridor lunchrooms is prepared in the well-equipped kitchen that adjoins the plant's 600-seat cafeteria on the main floor. And there's a beautiful lounge next to the cafeteria. It seats 200 people at a time.

UPJOHN EMPLOYEES CATCH

Covered concourse under front end of new plant is used by company-operated buses to drop employees

GOOD FOR PRODUCT

120 air conditioning systems (75 of them in the manufacturing building). Conditioned air is supplied at a rate of more than 1,200,000 cubic feet per minute.

. . . AND GOOD FOR UPJOHN PEOPLE

Recreation lounge is right next to the cafeteria in the manufacturing building. It has enough furniture to seat 200 employees. There are table tennis and shuffleboard courts in an adjoining indoor recreation area. Picnic tables and garden furniture are also provided on terraces just outside the lounge—for those who want to bask in the sun.

HOME BOUND BUS . . .

when they arrive in the morning, pick them up when they leave.

. . . AT FRONT END OF SERVICE CORRIDOR

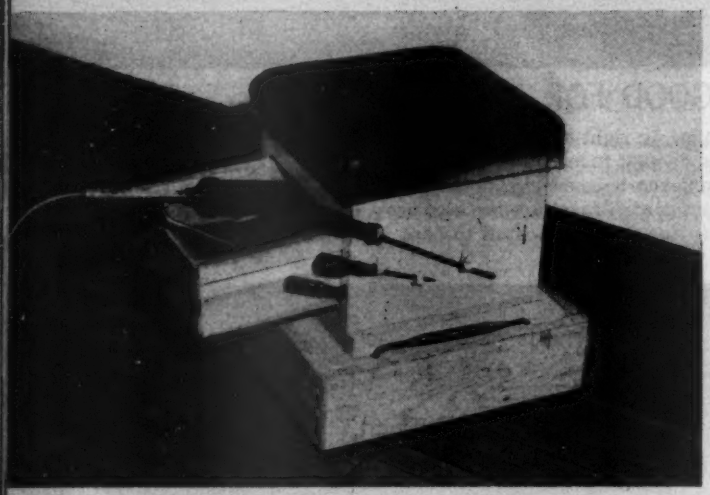
Corridor extends from front to rear of plant, provides direct access to locker rooms. Three 120-seat lunchrooms are located along it.

OPERATING SHORTS

Resistance Soldering Jig Eliminates Bottleneck

A customer's special requirement—to solder the heat exchanger with the liquid line on the inside loop of the suction line—threatened to make a bottleneck in production at Victor Products Corporation, Hagerstown, Md. The heat exchanger had to be soldered in the straight and then coiled—and the soldering had to look good. An iron didn't solder fast enough or well enough.

New Method: The resistance soldering jig was developed with an old 5-kva. welding transformer and copper bus bars. The copper tube is placed in the jig, makes contact with the electrodes, and is heated to the required temperature. Soldering acid is applied, then the end of the solder is drawn along the crack between the tubes. The method is fast. Quality is good. And Victor saves solder.

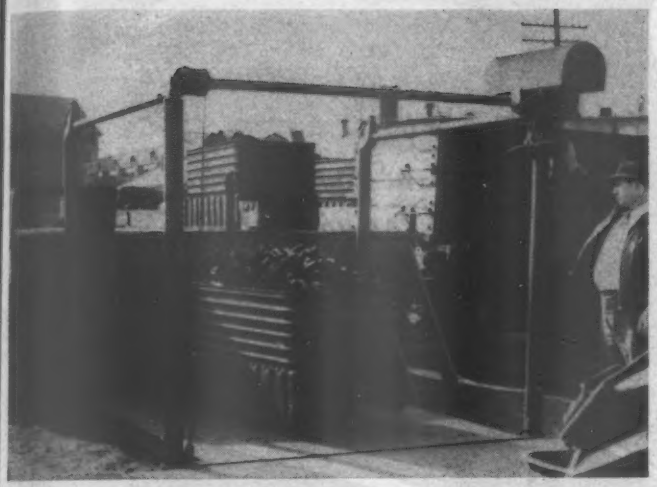


Walk-It Stool Increases Worker Comfort and Efficiency

Simple, convenient, and comfortable is this little stool used at International Business Machines Corporation, Endicott, N. Y., for special assembly and inspection operations. The stool is only 14 inches from the floor, has easy-moving casters so the worker can walk it to any position around the machine he is working on. A drawer holds all the tools needed, except the ones most frequently used—they are attached to the side of the stool, within easy reach. A few have back rests. Some are only 6 inches from the floor, for special wiring operations.

Air-Operated Dolly Handles and Tilts 1-Ton Reel

One man and an unloading dolly operated by compressed air handle what was formerly a 4-man lifting job at Tinnerman Products, Inc., Cleveland. The dolly carries a rewind reel of strip steel weighing a ton, tilts it 90 degrees to lie flat on a conveyor. The dolly is made of steel plate, measures 2x3 feet, and is the same height as the conveyor. As the rewind reel is filled, a 5-in. compressed air cylinder moves the dolly into vertical position. Slit coils are then stripped from the arbor by a stripper operated by a 2-in. compressed-air cylinder. Dolly returns to horizontal position (by means of a cam track) and arbor is retracted automatically. Operator then pushes slit coil onto conveyor that carries it to inspection bench.



Leveler Makes Car Loading A One-Man Operation

Here's an electric leveler that will lift up to 6000 pounds of materials 5 feet in a minute. It needs no subsurface installation, can be used inside the plant or in the yard to make truck and car loading a real one-man operation. One type is set on casters, so workers can move it from place to place, wherever it's needed. The lifting is done electrically with cables, like a modern passenger elevator.

Source: Service & Caster Truck Corporation

Plastic Deflectors Give Better Visibility on Belt Conveyor

Plastic deflectors on the assembly conveyor in the motor department at Electrolux Corporation, Old Greenwich, Conn., make it easier for operators to see parts traveling on the belt. The initial cost was low because use of plastic cut out the need for sheetmetal work. Also, plastic has no sharp corners on which operators might cut themselves.

Pressurized D.C. Equipment Safe for Dusty Areas

These variable d.c. control and motor generator sets were installed in a steel mill right next to the driven machinery. Pressurizing makes it safe. The sets have closed bed plates which serve as main air ducts for the forced ventilation system. A motor-driven blower mounted at the extreme end of the bed plate provides forced ventilation, prevents entrance of dirt and dust. Blower has a renewable-type air filter.

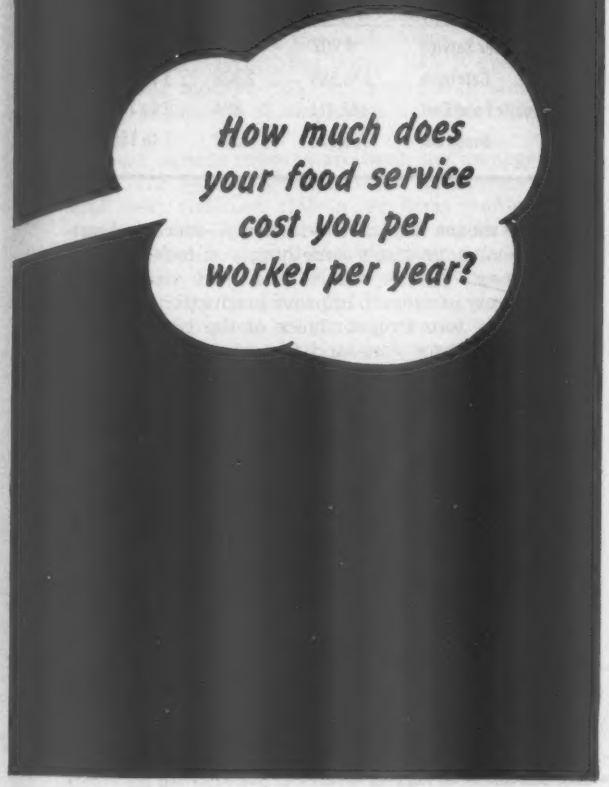
Source: Westinghouse Electric Corporation

Could you expand your food service if you had to? How?
Are you sure you're using the right type of food service for your plant?
Are you utilizing food-service manpower as fully as you can?

FREELANCE PHOTOGRAPHERS GUILD

Your In-Plant Feeding:

- **Do you have a cafeteria? If so, you're among the 79% of plants that have one.**
- **What percentage of your workers are you feeding? Current average is 59%. It was 40% in 1944.**
- **Losing money on food service? Cheer up. Of plants that run their own, 77% lose. Of plants that have caterers, 45%.**
- **Are you losing less than $6 per worker per year on your in-plant feeding? If so, stop worrying. That's today's average.**
- **How about decentralizing? With a food cart one worker can serve 127 customers. Cafeteria ratio: 1 to 61.**
- **How about food carts or snack bars? They're used—one or both—by 61% of the plants.**
- **Using vending machines for foods and drinks? They're 75% more popular than in World War II.**
- **Need an industrial caterer to run things? Outside caterers now operate more than half of all food services surveyed.**



How Good?

- **What about wages? Trend is to pay food workers in line with shop levels.**

All of these facts are from a major survey of in-plant feeding that covers 240 plants with 667,395 workers. It was made by Caroline Bird Menuez for the Paper Cup & Container Institute, Inc., New York.

Here, in this article, FACTORY brings you the results—to serve as a guide to ways to do a better job of feeding employees at lowest possible costs.

You won't get all the answers to your problem on a silver platter. But you will get the facts you need to figure out your own answers.

THE BIG HEADACHES LAST TIME

MANPOWER, MONEY, AND SERVICE were the big in-plant feeding headaches of World War II. They still are—a survey of 240 manufacturing companies shows. Let's take a quick look at World War II troubles:

Manpower—Finding food service workers wasn't the only manpower problem. Keeping them was even tougher. Odd shift hours, transportation troubles, and pay differentials were complicating factors.

Money—Big operating deficits for food service were the rule rather than the exception. Despite tales of "lush war profits," employers found the deficit problem a tough one to handle. Why not make a profit? Or at least, why not break even? But how?

Service—The problems of good service were as tough as the money question. There were too many mouths to feed, and plant executives didn't know just what to do about it. Improvised facilities broke down under the load. Inexperienced plant operating men often picked the wrong type of food service that didn't fit plant needs. And service was just plain slow, stealing time from production.

Sounds like a mess. And it was, executives frankly admit.

WHAT ABOUT "NEXT TIME?"

"We'll never make the same mistakes again!" That's the resolution you hear in plant after plant. Sounds good. But resolutions are easily broken. Big question: Have employers really profited from the lessons learned in World War II? Will they be any more ready to feed employees during heavy war production than they were 10 years ago—or are they just talking?

The answer comes in the plans for expansion cited by 239 of the 240 plants surveyed. Two out of 10 plants are planning right now to expand their food services, so they won't be caught. In addition, 82% of the 239 report that their existing food services are capable of handling at least as many workers as they had at their World War II peak employment.

They're realistic in applying what they learned in World War II. They're not putting all their eggs in one basket. As a result, 52% of the plans mentioned aim at *decentralizing* food service, to keep from bottlenecking everything in one crowded cafeteria. Here are the methods used by that 52%: mobile food carts, by 23%; snack bars right in the shop, 17%; and food and drink vending machines, 12%. Only one company in 10 would build a new cafeteria. Most plans involving cafeterias would increase the capacity of what's already being used.

Not all in-plant feeding plans are perfect. Field visits show that some companies are too optimistic in figuring the theoretical capacity of their food service. But, on the whole, the evidence is pretty clear that the companies surveyed have learned a lot from previous mistakes.

Turn the page for facts about 240 companies' food service. They'll give you standards by which you can judge your own—and improve it.

MANPOWER

IN-PLANT FEEDING . . . begins on page 120

HOW TO MAKE BEST USE OF MANPOWER

What the survey shows: Snack bars and mobile food carts are the in-plant feeding systems that make best use of manpower in relation to number of customers served. Cafeterias come next. Last, and by far the most wasteful, are waiter-service restaurants. These conclusions come from analysis of the foodworker-customer ratios of the 182 plants that gave complete information on this point.

What the field visits show: You can't compare the quality of service from a snack bar or food cart with a hot meal in a cafeteria or restaurant. But, say employers who use them, these "short-order" types of service reach more workers and enjoy a higher percentage of patronage than the more elaborate setups. They cost less, so they tend to break even more often.

For some plants, snacks bars and mobile carts are really the only solution to the feeding problem. Big steel mills, for example, and aircraft plants, shipyards, and foundries—where operations are spread far and wide. More concentrated plants suffering from acute shortage of space also find them invaluable. For such plants, the superior foodworker-customer ratios of short-order service systems are a secondary consideration—but no less apreciated. Many other methods of making better use of available manpower were suggested by employers in the field visits:

1. **Multiply job assignments:** Cuts duplication.
2. **Self-busing:** Reduces clean-up staff.
3. **Use of paper service:** Cuts dishwashing.
4. **Part-time use of employees:** Adds flexibility.

FOOD WORKER—CUSTOMER RATIOS BY TYPE OF FOOD SERVICE

TYPE OF SERVICE	NO. PEOPLE FED DAILY	NO. FOOD WORKERS	RATIO
Waiter Service	4,702	170	1 to 28
Cafeteria	176,555	2,908	1 to 61
Mobile Food Cart	102,411	804	1 to 127
Snack Bar	55,535	348	1 to 159

What this means to you: Productivity—increased output per man-hour—isn't something you look for just in the shop. Survey results and field visits show there's plenty of room to improve productivity in your food service, too. Proper choice of the type of service that's right for you—and that gives you the best foodworker-customer ratio—is only part of what you can do. You'll want to know how your performance compares with that of others. Figuring your own ratio is the first step. You'll also want to consider methods improvements and other simple labor-saving techniques—like those mentioned before—that will allow you to pay good wages and still keep your labor cost down.

If you're thinking about expanding your food service, don't overlook the values of snack bars and mobile carts. They'll save you space and money. And they're easily "mothballed" when you no longer need them.

MONEY

COMPANY POLICY AND PRACTICE ON COST OF FOOD SERVICE

COMPANY-OPERATED SERVICE				OUTSIDE-OPERATED SERVICE			
POLICY	NO. FIRMS CITING	NO. FIRMS LOSING MONEY	% LOSING MONEY	POLICY	NO. FIRMS CITING	NO. FIRMS LOSING MONEY	% LOSING MONEY
Plan to break even	58	33	57%	Operator take profit or loss	53	15	28%
Plan for "reasonable deficit"	68	66	97%	Take % of operation's profits	13	6	43%
Plan for "reasonable profit"	4	1	25%	Guarantee operators' losses	9	3	33%
				Pay management fee to operator	30	23	77%
TOTAL	130	100	77%	TOTAL	105	47	45%

COMPANY POLICY

What the survey shows: Practically no one expects to—or does—make money on in-plant food services. Those who plan to lose money as a deliberate policy have no trouble in doing so. Firms that plan to break even are more often disappointed than not. More than half lose money. Even those who hire caterers on a "take the risk" basis find they often have to put money into the kitty for one reason or another. In

general, however, your chances of getting off without a loss are better if you hire an outsider to run your food service. Company-operated services were in the red 75% more often than those run by outsiders. The full results:

What the field visits show: The great majority of companies visited are reconciled to the fact that food service will cost them money. Many make regular budgetary allowance for such losses. They don't relish it, they report, but would like it even less if they *made* money. "Do that and you're accused of taking advantage of employees," is the typical reaction.

Where outside caterers are used, the arrangements vary. The general practice is to "give away" rent, light, heat, and fuel. Only a few firms counted these items as costs. If more did, the list of money losers would be much bigger. The two most popular plans for caterers are to let them take all profits or losses, or to pay them a stated fee for managing the food service. Other plans are generally variations of these.

Regardless of the plan, companies generally watch caterers closely, and exercise control over prices and quality of food. Caterers have learned, too, that cutting corners isn't smart. "A quick way to lose an account," is the way they put it. But another adage of this new industry is equally apt: "You've got to make money in spite of the client." What the caterers are thinking of is the long list of whims, peculiarities, and special service demands that they have to meet.

An operating executive will insist on home-baked pastry, for example, even though there are too few customers to make it pay. Or he won't tell the food service people about shift changes soon enough to let them prepare economical amounts of food. Or he will order special openings for small work crews late at night or over week ends. Or he'll demand special service for executives at no additional charge.

"Good employee relations," say the caterers. "But tough on us, because we have to take it in stride and come out solvent—without hurting anybody's feelings. It's not easy."

What it means to you: If your food service is costing you money, cheer up. You're in good company—lots of it. If that's what you want, fine. If it isn't, there are at least three things you can do:

1. Look into the possibility of getting an industrial caterer in, assuming you don't have one already. On an operator-take-profit-or-loss basis, your chances of breaking even are good.
2. Look into the demands for special service you're making. Are they unreasonably costly, unnecessary?
3. How about waste of food, inefficient purchasing, and unattractive menus that turn customers away? These and other internal operating defects may be the reason for your losses. They're worth checking.

ACTUAL COMPANY LOSSES

What the survey shows: If you're "average," you're losing about $6 per employee per year on your food service. Among the 97 plants that gave full information on this subject in the survey, the average loss per plant per year was $22,254. This is a "large plant" figure, since the average plant employed just over 3700 workers. But it is significant that the larger losses occur in the relatively smaller plants (see far right column in table above). So don't think these big losses may not apply to you just because you're small.

AMOUNT OF FOOD SERVICE LOSS PER WORKER PER YEAR

LOSS (PER WORKER PER YEAR)	NO. PLANTS REPORTING	NO. WORKERS INVOLVED	AVERAGE NO. WORKERS
0—$ 3	44	207,151	4708
$ 3—$ 6	21	79,010	3762
$ 6—$ 9	12	39,069	3256
$ 9—$12	5	8,561	1712
$12—$15	5	7,348	1469
$15—$18	6	9,497	1583
Over $18	4	9,140	2285
TOTAL	97	359,776	3709

The range of losses was broad—from a few cents to a high of $25.80 per worker per year for a Pennsylvania paper company that reported nearly 100% support of its company-run cafeteria.

What the field visits show: The outstanding example of high cost of food service encountered was an oil refinery. Counting all workers, its *per capita* loss was $25.68 per person per year—second highest reported. But this company feeds only about one-fifth of its people. So the *per capita* cost on the 1160 workers actually fed amounts to $10.35 a month or $124.20 per person per year. On an annual basis, food service costs this plant over $144,000 out of pocket. Commenting on this remarkably liberal policy, the plant manager says:

"We don't believe in giving food away because no one appreciates what is free. But we are sure that our highest skilled workers know they are getting a big break on their lunches. All they have to do is compare our prices and portions with those of restaurants or their own home grocery bills."

To a lesser degree, this attitude is rather typical. Many companies are startled when losses are reduced to an annual *per capita* basis. But they are quick to conclude that, in these days of liberal "fringe" benefits, the average loss looms rather small. Substantially less, for example, than a single paid holiday.

That does not mean, however, that employers are unconcerned over food service costs. One company with 1180 workers, for example, points out that "hidden costs"—like those of accidents—also have to be considered if you want the full story. This company claims its food service costs it $2000 a month in lost time alone—presumably due to loitering in the cafeteria and stealing out for snacks on company time.

What this means to you: Finding what your food service costs per worker per year is a smart thing to do. It helps to straighten out your thinking about what you should be doing. More important, it lets you compare your food service cost with the cost of other "fringe" benefits like vacations.

More on next page

SERVICE

IN-PLANT FEEDING . . . begins on page 120

TRENDS IN SERVICE SINCE WORLD WAR II

What the survey shows: Employers are feeding more of their workers than ever, and using more types of service to do it. In November, 1950, 206 companies were feeding an average of 59% of their 667,395 workers. At the height of World War II—1944—the national average was only 40%, as reported in a survey by the War Food Administration. By this standard, employers are currently feeding almost 50% more workers. This applies generally to plants of all sizes.

Cafeterias are by far the most popular type of food service, followed by mobile food carts and snack bars. The waiter-service restaurant, usually kept for executives and guests, is least popular. One out of 10 plants with less than 5000 workers used such restaurants. But they were used in over one out of three plants with more than 5000 workers.

Plants that added various types of food service during the war have kept them since—and have even expanded some. This despite the fact that comparisons are with World War II *peak* figures. Also despite the fact that 55% of the firms have fewer workers, and only 27% have more than at war time peaks. The expansion has come in two directions—more cafeterias and more snack bars. Use of mobile food carts hasn't changed, and waiter service restaurants have declined slightly in popularity.

Vending machines have also played a solid part in increasing the variety of food service in the plants surveyed. Since World War II, use of vending machines for food and drink purposes has increased 75% among the 118 firms that gave full figures for wartime and present operations. The big increase came in vending of coffee, cookies, ice cream, and fruit juices. Cakes, pies, and sandwiches apparently haven't yet caught on as vendable items.

What the field visits show: Interviews show little evidence that industry looks on in-plant feeding just as a "frill," to be lightly discarded. Instead of shutting down food services started up during the war, employers have continued, often enlarged them.

As a result of widespread acceptance of responsibility for in-plant feeding of workers, several changes in thinking have been taking place in industrial plants:

1. Employers say they are paying more attention to the "forgotten worker." That's one of the big reasons behind decentralizing service with snack bars and mobile food charts—also for setting up supplementary service with vending machines. That way men who are scattered far and wide get at least some of the services others have been getting for a long time.

2. Rules forbidding men to eat at their workplaces are steadily going out. Companies that would never have thought of allowing such "liberties" years ago now just take it for granted that workers may eat at will—if they don't hold up production. Some operating executives even report they are convinced that workers produce more when allowed to eat at will.

3. Operating executives seem to be losing their fear that vending machines will disrupt production. Many

NUMBER OF EMPLOYEES FED NOVEMBER, 1950

SIZE OF PLANT (NO. EMPLOYEES)	NO. PLANTS REPLYING	TOTAL NO. EMPLOYEES	NO. EMPLOYEES FED	% FED
0 — 999	18	11,652	6,971	60%
1000 — 1999	95	131,930	82,187	62%
2000 — 2999	42	98,094	63,655	65%
3000 — 4999	21	75,733	44,670	59%
5000 — 10,000	17	110,240	54,665	50%
Over 10,000	13	239,746	140,975	59%
No Answer	34			
TOTAL	240	667,395	393,123	59%

POPULARITY OF TYPES OF FOOD SERVICE WORLD WAR II PEAK VS. NOVEMBER, 1950

	WORLD WAR II PEAK		NOVEMBER, 1950	
TYPE OF SERVICE	NO. PLANTS	%	NO. PLANTS	%
Cafeteria	133	75%	169	79%
Waiter Service	26	15%	28	13%
Snack Bar	40	23%	61	28%
Mobile Food Cart	58	33%	71	33%
NO. PLANTS REPLYING	176*		215*	

*Many plants reported more than one type of food service, so "number of plants" columns will be larger than total number of plants replying. Percentages add up to over 100% for the same reason.

POPULARITY OF VENDING MACHINES WORLD WAR II PEAK VS. NOVEMBER, 1950

NO. COMPANIES REPORTING (OUT OF 118 GIVING FULL DATA FOR BOTH TIMES)

ITEMS VENDED	WORLD WAR II PEAK	NOVEMBER 1950
Carbonated Drinks (bottles)	64	65
Carbonated Drinks (Paper cups)	32	64
Milk	21	29
Coffee	3	23
Cookies	2	15
Ice Cream	5	15
Fruit Juices	2	13
Cakes and Pies	3	6
Sandwiches	2	3
TOTAL	134	233
% INCREASE		74%

of those questioned admitted frankly that they had been skeptical before the war. Almost everyone mentioned a survey, allegedly made by a large manufacturer, that showed vending machines actually increased production.

4. A good many plants are leaning away from handling cash in their snack bars and mobile food carts —to cut losses and protect employees. Some have actually abandoned cash entirely. At Allis-Chalmers, lunch coupon books good for $2.10 are sold on Mondays for $2. The girls running food carts simply collect coupons. At one U. S. Steel plant, the payroll department issues non-transferable meal books that employees must sign. This is an example of how meal-ticket systems can be designed to prevent misuse. In some plants workers, if not stopped, will sell books at a discount when they need cash.

5. Plant food services are getting to be more democratic. Special treatment for select groups is widely regarded as poor industrial relations. There are still a lot of executive dining rooms, but the attitude seems to be that they're bad business for all but the very big plants. In many plants, the boast is that "*everybody* stands in line to get fed." Workers like it, they say, and—off the record—"it's good for the big wheels, too. Gives them a little better feel for the shop and shop people."

What it means to you: In-plant feeding is here to stay. Workers expect it, and the great majority of employers take it for granted as the thing to do. If you employ 500 workers or more, and aren't providing food service, this is a good time to start preparing for the day when you may have to go into the food business. In a tight labor market, you may find—as many did in World War II—that you'll be glad to do things you never thought you'd do.

If you're already providing food service, now's the time to look it over. Can you cut costs and improve service by decentralizing—as many have done? Will vending machines right in the shop help supplement snack bars and food carts? And are you *sure* that letting workers eat at their work places will interfere with production?

Are you feeding a fair percentage of workers—say three out of five? If not, what's wrong? Are you wasting money and maybe hurting industrial relations by a costly "caste system"?

These are some of the questions to ask—and answer—if you're to make the most of the chance to improve your service.

PLANT VS. OUTSIDE MANAGEMENT

What the survey shows: More employers than ever are passing food service management on to others. As of November, 1950, 51% of all food services reported were run by outside caterers, compared with 45% at World War II peak operation. Every type of service followed the trend. The largest shifts involved waiter-service restaurants and cafeterias. These happen also to be the two types of service that are still most often company-operated. On the other hand, better than three out of five snack bars and mobile food carts are outside-managed.

What the field visits show: Wartime operating headaches are the big reason for the continued trend toward outside food service managements. So most plant executives report. That's to be expected. But behind it all is the general feeling that food service, though necessary, is a fertile source of employee complaints. As one shrewd personnel director puts it: "We like to have at least one kind of grievance on which we can side with the union. So we hired a caterer." And the caterers interviewed are reconciled to the fact that they are hired at least in part to "get the company off the hook." They cite many examples of the frustrating perverseness of human nature on the subject of food.

OUTSIDE MANAGEMENT OF FOOD SERVICE WORLD WAR II PEAK VS. NOVEMBER, 1950

	WORLD WAR II PEAK		NOVEMBER, 1950	
TYPE OF SERVICE	NO. REPLIES	% OUTSIDE MANAGED	NO. REPLIES	% OUTSIDE MANAGED
Waiter Service	22	23%	27	37%
Cafeteria	152	38%	182	45%
Snack Bar	51	57%	62	61%
Mobile Food Cart	69	61%	72	65%
TOTAL	294	45%	343	51%

One caterer reports what happened when two union representatives came in to complain about the coffee:

"What's wrong?" we asked; "maybe we can fix it."

"Weak as dishwater," snapped the first man.

"The hell it is," jeered the second. "The stuff's so strong you can float a battleship in it."

"The two fought it out for five minutes before they realized we hadn't said a word," concludes the caterer. "We had no trouble with them after that."

Another caterer tells how he turned the wrath of a union steward who claimed the cafeteria food was "awful:"

"When did you eat there last?" asked the caterer.

"The food's so awful," said the steward dramatically, "that I've never eaten there!"

In general, caterers say their appeal to management lies in the fact that they have two things to sell—know-how, and the capacity to absorb grief.

Most managements agree with this summing-up.

What this means to you: Right now, the existence of many large and experienced industrial caterers is an asset that you can count on as the country moves ahead on defense production. If you're suddenly faced with heavy expansion, your food-service problems will be in pleasant contrast to those of 1941 and 1942. Then you had to run pretty much on your own. Now—if you need to—you can find many experienced organizations that are well equipped to design and run your food service for you.

But don't expect an outsider to be the "goat." He can't act as an overnight cure-all for failure to plan sound physical facilities, suitable types of service, and sensible policies. By all means get the experts to help. But don't forget: It's still *your* plant, and your workers that you're providing with food service. Whoever does it, it's *your* job to see that it gets done right—today and tomorrow.

HOW YOU CAN MAKE YOUR PLANT

By J.W.L. BENSON
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IF YOU'RE DISSATISFIED with your maintenance setup, this article will help you pin-point the trouble.

IF YOU THINK YOUR SETUP IS TOPS, you may discover there's still room for improvement.

FOR THERE ARE LOTS OF MONEY-SAVING IDEAS tucked in between the principles and practices the author espouses.

"HOW SHOULD I ORGANIZE and equip my maintenance department?" That's the question I'm asked to answer.

Start *at the beginning,* I claim, if you want to do a good job. Not in the middle, as many try to do—and then wonder why their widespread plans don't jell.

First get management to define the functions you are responsible for. Then you don't waste any time on what isn't your business. And you can build up soundly on everything that is.

I believe an ideal plant engineering setup carries out four broad functions in the establishment and operation of plant and facilities. Leave out any of these four activities and you'll need to prop up a sagging organization continually:

1. SELECTION—effected by supervision of design of buildings, machinery, and equipment.
2. INSTALLATION—effected by provision of the plant and facilities needed for manufacture of the product.
3. MAINTENANCE—effected by inspection, upkeep, and repair of plant and facilities.
4. IMPROVEMENT—effected by a program of continual study of plant and facilities for ways to increase production and lower costs.

There are certain basic tools that every plant needs in the way of engineering organization and maintenance equipment to do an efficient job. I sum them up in twelve steps you need to take if you are to fulfill the four major functions of plant engineering.

1 PUT A COMPETENT PLANT ENGINEER IN CHARGE

He is a part of top management, and has its confidence and backing in plant engineering matters. He directs all activities of construction and maintenance work.

As such, the plant engineer must have wide experience in the basic facts of all branches of engineering. He must be familiar with all phases of construction and contracting. His knowledge of contracting will be very valuable in making cost estimates.

The competent plant engineer sizes his organization to the job. His organization includes master mechanics, assistant engineers, draftsmen, and any specialists required for his particular industry. The extent of engineering work performed, as well as new building construction, major repair work, and general improvements, depends on the size of the plant. If there are outside concerns near the plant that can handle certain jobs, this will affect the size of the organization.

If the plant is large enough to maintain a well-organized engineering staff and maintenance force, the plant engineer will be able to do work very economically and also render a major service to the plant. By this I mean that with well-trained crews of craftsmen you can do a prompt repair job, thereby holding a high level of production. You will find there's nothing equal to a plant training course for craftsmen to make them familiar with all phases of repair work.

2 AIM FOR GOOD TEAMWORK BETWEEN MAINTENANCE AND PRODUCTION

To get the best results in maintenance work, the engineering department and its maintenance force cooperates closely with all production superintendents and foremen. The maintenance department is more or less in the position of a public utility. All the other departments are its customers, and they are dependent on it for service. If the service fails, production stops. If delays are long, they may cause jam-ups in other departments. Any good maintenance program must therefore be built around service. You should make every effort to keep good relations between maintenance men and the production departments.

MAINTENANCE PROGRAM CLICK

3 SEE THAT PLANT ENGINEERING AND PURCHASING DEPARTMENTS WORK IN CLOSE HARMONY

The purchasing department is responsible for keeping a stock of mill supplies on hand at all times. Requisitions from various departments clear through the plant engineering department for approval before a purchase order is written. In many cases it is cheaper to make special repair parts in the shops than to buy them outside. Sometimes a substitution of material greatly improves a machine operation.

Carrying sufficient supplies, materials, and spare parts in stock is one sure way to expedite repair work. If your plant is in an isolated location, larger stocks are required. If the plant is near mill supply houses, your parts inventory may be reduced. However, to be sure of lowest costs, leave this up to the purchasing department.

A well-organized receiving department is in charge of the stockroom. Its staff checks in all materials, supplies, and equipment. This is necessary so that the purchasing department can at all times determine whether or not orders are completed.

The engineering department prepares plans and specifications and a bill of materials for all new jobs. Labor and material costs are kept accurately.

4 GET YOURSELF SKILLED CRAFTSMEN AND GOOD TOOLS

A competent master mechanic is in full charge of all maintenance crews. He has craftsmen who can handle all normal plant engineering functions. Also shops and tools to get the most out of their skills.

Machinists • A well-equipped machine shop has lathes, milling machines, shapers, gear-cutting machines, heat-treating furnace, planer, power hacksaws, and metallizing equipment. It has lots of modern hand tools. Other machines depend on the type of industry the shop has to serve.

I suggest that the machine shop make as many machine parts as it can economically. This is good spare-time work when there are no major jobs.

I suggest further that the machine shop handle the reclamation of machine parts. This can be a sizable item in any large plant. If you instruct the machine shop foreman to inspect all worn-out parts, he is then in position to suggest improvements, by changing either the design or the materials.

You can reclaim many parts by metallizing. This applies particularly to building up studs, worn-out motor shafts, and other machine parts.

Welders • You need a good shop equipped to handle either acetylene or electric welding. It is prepared to do any type of welding—alloys, stainless steel, carbon steel, cast iron, aluminum. The welding shop can play an important part in the repair and reclamation of machines and machine parts.

Electricians • The electrical shop has the tools and testing equipment needed to make periodic checks of loads on motors, transformers, and other equipment. It has enough spare motors, starters, switches, V-belts, fuses, and other parts to meet any emergency.

The electrical shop has a well-planned preventive maintenance program. Regular inspections of motors, starters, switches, and other equipment are made and records kept of the results.

I suggest that elevators, hoisting equipment, electric cranes, and similar equipment be inspected and repaired by electricians.

Pipefitters and Plumbers • You need a well-equipped shop, with both power and hand tools.

I suggest that this shop have supervision of the cleaning of reservoirs and repairs to filters. Also, the men in this department should be a part of the fire protection organization.

Carpenters and Millwrights • This department has all types of power-driven woodworking machinery and all necessary hand tools. It takes care of repairs to buildings and any internal improvements inside the plant. The men may be called on to do all types of cabinet work. If the plant has outside property, they may all be called on to keep it in repair.

The number of carpenters depends to a large extent on whether the men have to do any new construction work.

Sheetmetal Workers • In some plants, sheetmetal work is a small item and is done by some outside contractor. In others it may be a very important department, depending on the type of process work done in the plant.

The equipment in this shop depends to a large extent on the function it has to perform. A fully equipped shop with modern tools always pays big dividends.

Painters • This department plays an important part in the maintenance program. A competent foreman directs all work. He makes regular inspections of the plant, checking all building, piping, machinery, and equipment to see that they are painted regularly and maintained in first-class condition.

In plants where buildings, machines, and equipment are subjected to acids, caustics, and alkalis, proper protection calls for regular painting with chemical-resistant paints. Proper selection and application of paint can often save costly repairs.

Painting buildings, both inside and outside, on a regular schedule is one of the first steps to a good housekeeping and safety program. It leads to better personnel relations. And it creates a spirit of cleanliness and interest throughout the plant.

Utility Men • Plants that need large blocks of power as well as considerable process steam, find it desirable to have their own power plant generating equipment.

If the processes in the plant require a considerable quantity of water, and if a filtration plant is necessary, it should be directly in charge of the power plant engineer.

More on next page

no failure of any unit in the plant. During week ends boilers, fans, pumps, and control equipment are thoroughly inspected and any necessary repairs are made.

Plant Protection • The fire hazards in plants vary considerably, depending on the type of process for the product that is manufactured.

It's a good idea to have a qualified fire inspector. He pays particular attention to any materials that might cause spontaneous combustion. He also makes regular inspection of all outside hose houses, post indicator valves, fire pumps, and reservoirs.

I suggest that this inspector be directly in charge of an organized fire brigade made up of operators in various departments throughout the plant. These men should be trained in the proper handling of fire fighting equipment. Periodically the brigades should go through fire drills in order to keep in training for this work. It is also highly desirable to have members of the fire brigade attend the State Fire Training School or any similar school that does an excellent job in training personnel for this work.

5 KEEP GOOD RECORDS

The good plant engineer insists on keeping maintenance records for various departments for several reasons:

a. These records keep a true picture of the cost of repair work.

b. They reveal facts that will be very helpful in setting up a preventive maintenance program.

c. They bring to mind some failure in a particular machine. By careful study, you can correct some of these failures by substitutions of better quality materials. In some cases you may have to re-design parts of a machine to reduce the high maintenance cost.

d. These records may influence the lubrication engineer to change the type of lubricant used and thereby improve the wearing qualities of the parts.

e. In some cases complete records will reveal that machines are overloaded.

Of course, record keeping can be carried to extremes and become a costly item to the organization. But records that give the bare facts in regard to life of machine parts and service rendered are of value to any maintenance program if studied properly and used in the right manner.

I suggest you keep records of all improvements and all new construction work. These records will be of much value in estimating future projects.

6 SET UP A GOOD LUBRICATION PROGRAM

The entire lubrication program of the ideal plant is under the direct supervision of a lubrication engineer. He is responsible for the selection of the proper lubricant for the job and sees that it is used as directed. He has studied the various machines in all departments with the idea of standardizing lubricants to use as few as is economically possible. He has developed schedules of lubrication and cleaning.

All oils, greases, and other lubricants are bought strictly according to specifications. Price is not a predominant factor in the selection of these materials.

Lubrication of isolated equipment, such as elevators, hoisting machinery, electric cranes, fans, pumps, and other miscellaneous equipment is also his responsibility.

I suggest that the electrical department handle the lubrication of all electric motors. In many cases this arrangement has led to detection of worn motor bearings and defective switches and wiring. Supervision of the lubrication of electric motors, however, always remains the responsibility of the lubrication engineer. The two departments have to cooperate to make this plan work properly.

7 SET UP A WELL-PLANNED PREVENTIVE MAINTENANCE PROGRAM

This phase of maintenance work is probably one of the most important factors in the whole program.

To set up a workable preventive maintenance program, the plant engineer gives careful thought to previous maintenance records. It is important for him to determine just how often to inspect machinery to find or detect failures before they actually occur. It's always a long-range program. But it's only when a *happy medium* of preventive maintenance is reached that the plant has a very workable program.

If you don't watch out, you can carry this inspection business too far. Just how often to inspect is the big question. This can only be determined by careful study of repair records that will show when breakdowns and failures occur. For example: After careful study of the records of elevator failures, we found that a weekly inspection of the elevators running on a three-shift period was sufficient to detect any major failure before it actually occurred.

8 GET A YARD CREW TO TAKE CARE OF OUTSIDE MAINTENANCE

In any maintenance program you need an outside yard crew to take care of general outside work. This crew maintains all roads, sidewalks, fences, lawns, shrubbery, and does other miscellaneous work.

In many cases this crew does unloading work throughout the plant and hauls materials from warehouses to various departments.

9 WORK CLOSELY WITH INDUSTRIAL AND RESEARCH ENGINEERING

The industrial and research engineering functions are usually set up as a separate department from maintenance work. Their job is to recommend operating improvements, which have to be put into effect by the plant engineering department. The industrial engineer may recommend a relayout of machinery to save labor. The research engineer may develop new machinery or new processes which will require considerable work by the maintenance department.

In some small plants, these two functions of industrial and research engineering come directly under the supervision of the plant engineer. Either way, to do the work properly and get the expected results, the maintenance department needs to know the full mind of the planner.

In many plants it will pay for the plant engineer to direct mechanical research work. By this I mean primarily, mechanical research in improvement of machinery and power transmission drives, and the application of electronics. Research can do many things to save labor and speed up production.

10 BE SURE TO COOPERATE WITH THE SAFETY ENGINEER

Whether or not the safety program comes under the jurisdiction of the plant engineer, the maintenance department cooperates with the safety engineer. It sees that all machinery, equipment, and properties are properly guarded and made safe. The safety engineer sends his recommendations to the plant engineer; from there they go to maintenance.

11 CONSULT WITH MANUFACTURERS' ENGINEERS

Machine and equipment manufacturers are constantly making improvements in their products and developing new ones. A good plant engineer makes every effort to consult regularly with manufacturer's engineers to get the latest information. He's overlooking one of the best sources for learning how to cut operating and maintenance costs if he doesn't.

12 DRAW ON OUTSIDE SERVICES FOR SPECIAL JOBS

A wise plant engineer calls on outside engineering service whenever he confronts specialized problems. Or whenever projects arise that are too big to handle, such as a large expansion program. There are many cases when an outside engineering service is invaluable to a plant engineer in solving problems in which he has had no particular experience.

TO SUM UP: All 12 of these basic tools are aimed at one purpose—producing a quality product at lower cost. That means a plant can't remain static. The plant engineer must do more than plan, install, and maintain a plant. *He must improve it.*

Here's how he can insure improvement: Make a comprehensive report at least once a year outlining:

1. Improvements that can be made in buildings, machinery, and equipment;
2. Capital expenditures needed;
3. Savings expected from each investment.

In preparing this report, don't overlook the help that operating executives and supervisors can give. Many a dim idea of an operating man when properly engineered has turned out to be a real money saver.

FILLING COLLAPSED RUBBER DRUM is easy. No venting is necessary.

TO EMPTY, place it on side, or . . .

Collapsing Drum Deflates Costs

WHEN YOU SHIP in U. S. Rubber's new rubber-fabric drum, both drum and return transportation costs collapse together. Over 2500 of these collapsed drums fit in a box car that would hold only 300 standard steel drums.

The drum is a tough, flexible 55-gal. container for industrial chemicals and dry powders. It needs no venting when filling or emptying. Round corners make the drums easier to clean, easier to handle on the ground.

Built-in hooks permit overhead suspension and travel on monorails. You can drain the drums rapidly from a hanging position with the addition of a metal support plate.

. . . **HANG** from overhead with baseplate.

NUMBER 9 IN A SERIES · Latest Developments in Electrical Equipment

By J. W. ST. ANDRE · Electrical Editor · FACTORY

TODAY'S NEW WIRING DEVICES

Whether you are putting in a new electrical distribution system or revamping your old one, today's wiring devices can save you money, give you greater protection, more reliable power for production.

BUS DUCT

THERE ARE MANY WAYS to distribute power in your plant. Each one is best for certain conditions. Since bus duct is flexible and reliable, it is widely used for secondary distribution—carrying 440 and 208/120 volts to machines and equipment.

Bus duct systems are especially adaptable in plants with a great many machine tools concentrated in one area. They can also be modified for plants where machine loads are scattered.

If you have large or long machine operations that would seem to rule out bus duct, the answer may be a combination of bus duct joined by conduit runs. Bus duct provides closely spaced plug-ins; the conduit carries the power efficiently through areas where no plug-in is needed.

If you have little space, or if you've had trouble with industrial trucks knocking power panels off columns, a good solution is a section of bus duct mounted overhead, fed by a conduit run.

Bus duct also makes a good distribution switchboard for small substations, if your plant is crowded. This method saves space for production that would otherwise be used by a secondary switchboard.

You have to plan and engineer bus duct systems carefully. Bus duct cannot be bent like conduit. Careful measurements must be made, especially if the bus duct goes around obstructions. All sorts of connections are available—fabricated elbows, crossovers, adapters.

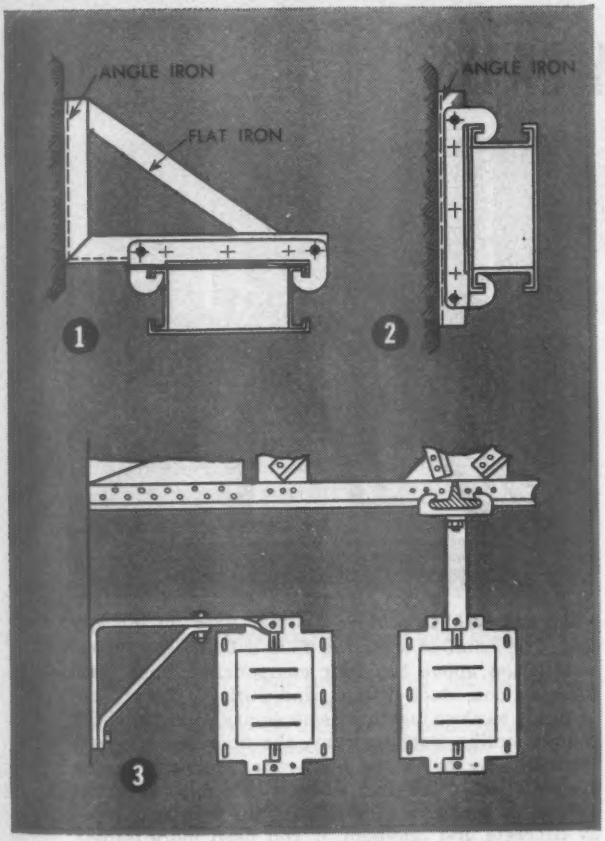
Most bus duct comes in 10-ft. lengths, though some manufacturers furnish shorter standard sections. A connection every 10 feet, or oftener, means lots of potential trouble spots. You'll have to make sure every connection bolt is made up tight. If it is not, you'll get in trouble when you begin loading up the duct—usually some little time after the installation.

You'll need cross-bracing on duct runs that are hung from the ceiling. There's no use ignoring human nature—your mechanics cannot resist the temptation to use bus duct as a support for their extension ladders. The strain may loosen or snap some of the connection bolts on the bus, and you may find it literally raining copper from above. (It happened to me!) So, for safety's sake, provide frequent, strong cross-bracing.

It's a good idea to check every connection bolt once a year. You can do the job with a wrench made of insulating material without interrupting service. This job you can't sidestep—if you want a trouble-free bus duct system, you'll have to give it a little attention once in a while.

FEEDER DUCT carries heavy current from one place to another. It consists of heavy copper buses arranged to cut down voltage drop due to impedance. Feeder duct has no openings for plug-ins. If local codes permit, you can use weatherproof feeder duct to carry power between buildings, as shown in the illustration. Good practice calls for gaskets between top and bottom covers. Covers are usually fastened with bronze or cadmium-plated bolts.

PLUG-IN BUS DUCT is usually used for branch runs, to carry power to the point where it's used. Outlets are spaced every 12 inches for taking off current. Each phase consists of a single copper bar held in place in a steel enclosure by insulators. Three kinds of plug-in devices are standard: circuit breakers, type "A" load-break switches, and type "C" switches, used only for disconnect purposes. Types "A" and "C" use fuses to protect the equipment. Capacitor devices, to improve power factor or voltage conditions, plug in like switches. Combination line starters of the plug-in type are the latest devices to make bus duct even more flexible.



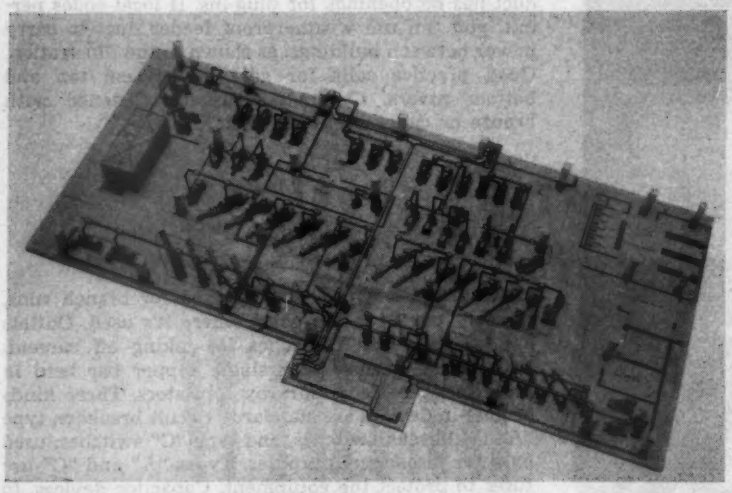
DUCT HANGERS are important, if you want to protect your bus duct from damage. Hangers are usually placed every 5 feet, to conform to the National Electrical Code, Art. 364, par. 3643: "Busways shall be securely supported at intervals not exceeding 5 feet unless specially approved for supports at greater intervals, but in no case shall the distance between supports exceed 10 feet." Figures 1 and 2 show the use of a C-type hanger to support the duct along the wall or close to the ceiling. Figure 3 shows a different type of hanger, a prefabricated clamp made in two halves that bolt together over the duct. Using these hangers eliminates drilling, bending, and cutting on the job.

On most bus duct systems you can plug-in from both sides. Install your system so you can take advantage of all of these outlets. You double the usefulness of the duct. No matter what you expect when you install the system, once it's in use you'll probably find you need more outlets than you had planned. Somehow you never seem to have too many openings in a bus duct system.

More on next page

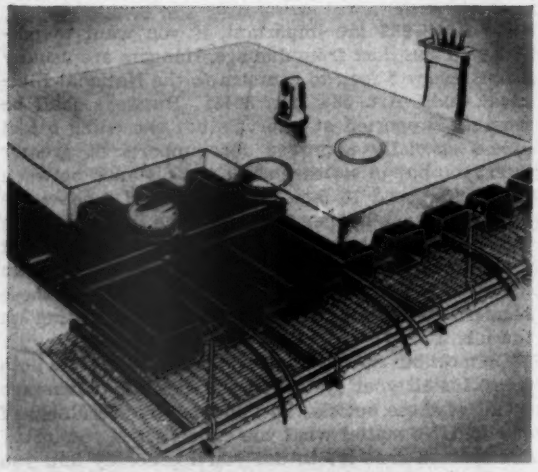
TODAY'S WIRING DEVICES . . . begins on page 130

CONDUIT AND CABLE

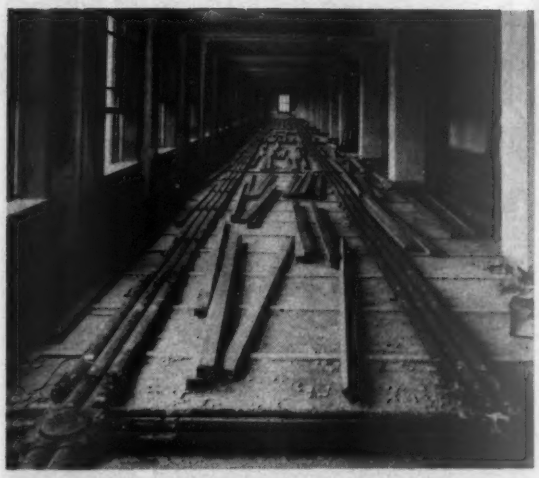


THE NEW LOOK in conduit installation is shown above. Conduit is still the most common form of electrical distribution within the plant. While most bus duct systems have to be carefully engineered, conduit runs usually require only the skill of the construction electrician to produce a neat, efficient, low-cost installation. The fittings in a modern system have detachable hub plates (right) to provide one, two, or three hubs so you can easily adapt the system to changing needs in the production departments.

FLOOR RACEWAYS



STEEL RACEWAYS, installed as an integral part of the floor, are very efficient for your office installations. The photograph shows a cross-section of a cellular steel floor which is part of the building. The raceways carry power lines for electric typewriters and other office equipment, all needing 110 volts. Simple electric fittings make the raceway part of the wiring system. The raceways are on 6-in. centers, so there are eight possible outlet locations in every square foot of floor surface. You can get rid of long extension cords.



FIBER RACEWAYS provide another floor wiring system to be installed when the plant is built. The typical installation above has four components—fiber duct, junction box, duct fittings, and outlets. Outlets can be put in as close together as necessary. One drawback is that, unlike steel raceway, the fiber raceway outlets can only be in the duct runs. Magnetic inserts are installed in the duct when it is laid, so it can be located by a compass finder after the floor is covered by concrete and linoleum, if you need more outlets.

More on page 134

IT COSTS $5.50 A DAY TO FEED AN ELEPHANT... ONLY 34 CENTS TO "FEED" AN

Exide-Ironclad BATTERY

Thirty-four cents a day pays the full power cost of an Exide-Ironclad battery-powered industrial truck. Lifting, hauling and tiering all day long, it handles more tonnage than a herd of husky tuskers could move in equal time.

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INSTANT SURGE OF POWER, plus finger-tip control, split-second handling, easy maneuvering, accurate spotting.
ROUND-THE-CLOCK PERFORMANCE—no mechanical troubles, no unscheduled down time.
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There are Exide-Ironclad Batteries for every size and make of battery electric truck.

Write for more facts and FREE copy of Exide-Ironclad Topics. It contains latest developments in materials handling . . . shows actual case histories.

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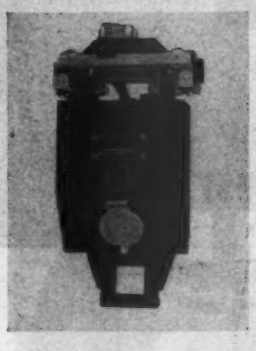
TODAY'S WIRING DEVICES . . . begins on page 130

MOBILE POWER OUTLETS

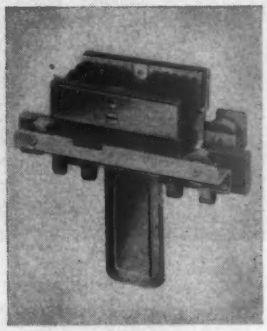
MOBILE EQUIPMENT draws power from steel-enclosed bus bars in a modern installation. Trolleys collect power, transmit it to moving equipment. In the past, open trolley wires were the accepted method. Since the wires sag between supports, they move every time the trolleys pass. Sooner or later the wires are likely to break and drop down on equipment and workers. The steel enclosure eliminates this hazard, also prevents accidental contact with the open wire.

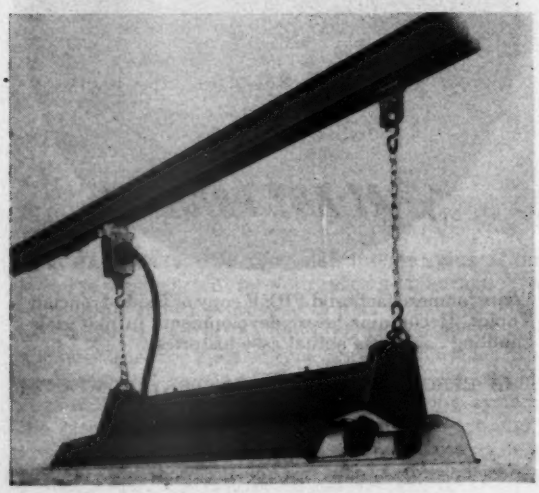
POWER FEED RAIL supplies electricity for portable hand tools. You can now get ratings up to 500 amperes per conductor, with trolleys that can handle 250 amperes. Photograph shows how feed rail makes it possible to take the tools to the work without interference from cables. Track and tool hangers with balancers help support tool weight, cuttting down operator fatigue and increasing efficiency. Such a feed rail is also useful to supply power to moving production lines and test lines.



◀ **TROLLEY COLLECTORS** (left) can be fused separately. If a tool is faulty, it blows its own fuse instead of the main one. This prevents one tool putting the whole system out. It also gives the proper protection to the individual tool which is not obtained by one large fuse for several tools.

▶ **TOOLS** for keeping the tracks clean in dusty or corrosive atmospheres are available. The bristle brush shown in the photograph on the right can be inserted into the duct. Another type uses emery which polishes the rails in case they are burned or pitted.





MOBILE LIGHTING FEED RAIL makes the lighting system very flexible. It's smaller than the type used for power loads and is rated for 125-volt service. As the illustration shows, a combination of plug-in jack and fixture hangers makes it possible to move the fixture along the track wherever it's needed, without rewiring. You take the light to the work instead of the work to the light.

More on page 136

NEW SUN PRODUCT CLEANS HYDRAULIC SYSTEMS Without Downtime!

SUN'S NEW HYDRAULIC SYSTEM CLEANER eliminates the production loss and man-hour loss that usually go with the cleaning of equipment. This product does its work *without interrupting production*. It has the detergency to remove the sludges and gums formed by oxidation of hydraulic oil, soaps formed from coolants and cutting oils, and other contaminants. Besides permitting operations to go on undisturbed, it protects the system against further rusting once parts have been cleaned. Sun Hydraulic System Cleaner has been thoroughly "Job Proved" in cleaning up hydraulic systems of presses, machine tools, and circulating systems of a great variety of industrial equipment. It is available in viscosities suitable for any pump. Get peak performance out of *your* equipment by using Sun Hydraulic System Cleaner.

FREE!

to anyone who uses or maintains hydraulic equipment: this booklet by Sun Engineers on the fundamentals of hydraulic systems and the application of hydraulic oils. It will prove valuable as a guidebook in day-to-day work, a refresher course for engineers, or a readable instruction book for nonprofessionals.

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☐ I should like a copy of "Hydraulic Fundamentals and Industrial Hydraulic Oils."

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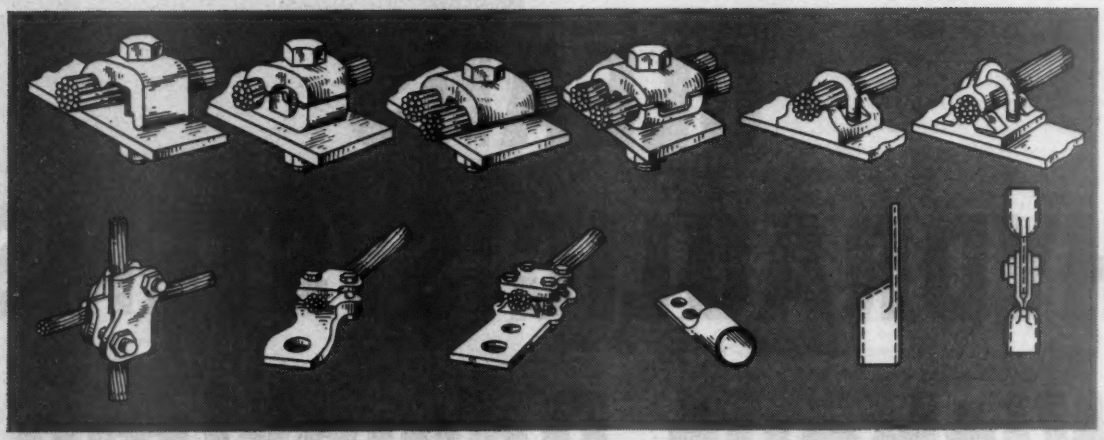
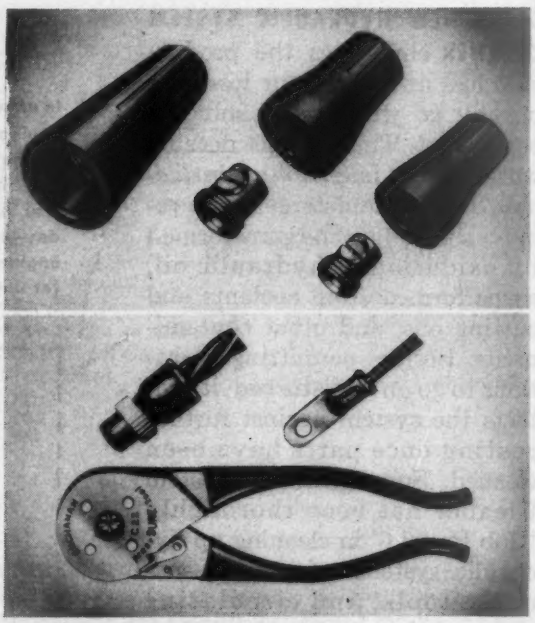
TODAY'S WIRING DEVICES . . . begins on page 130

CONNECTORS AND LUGS



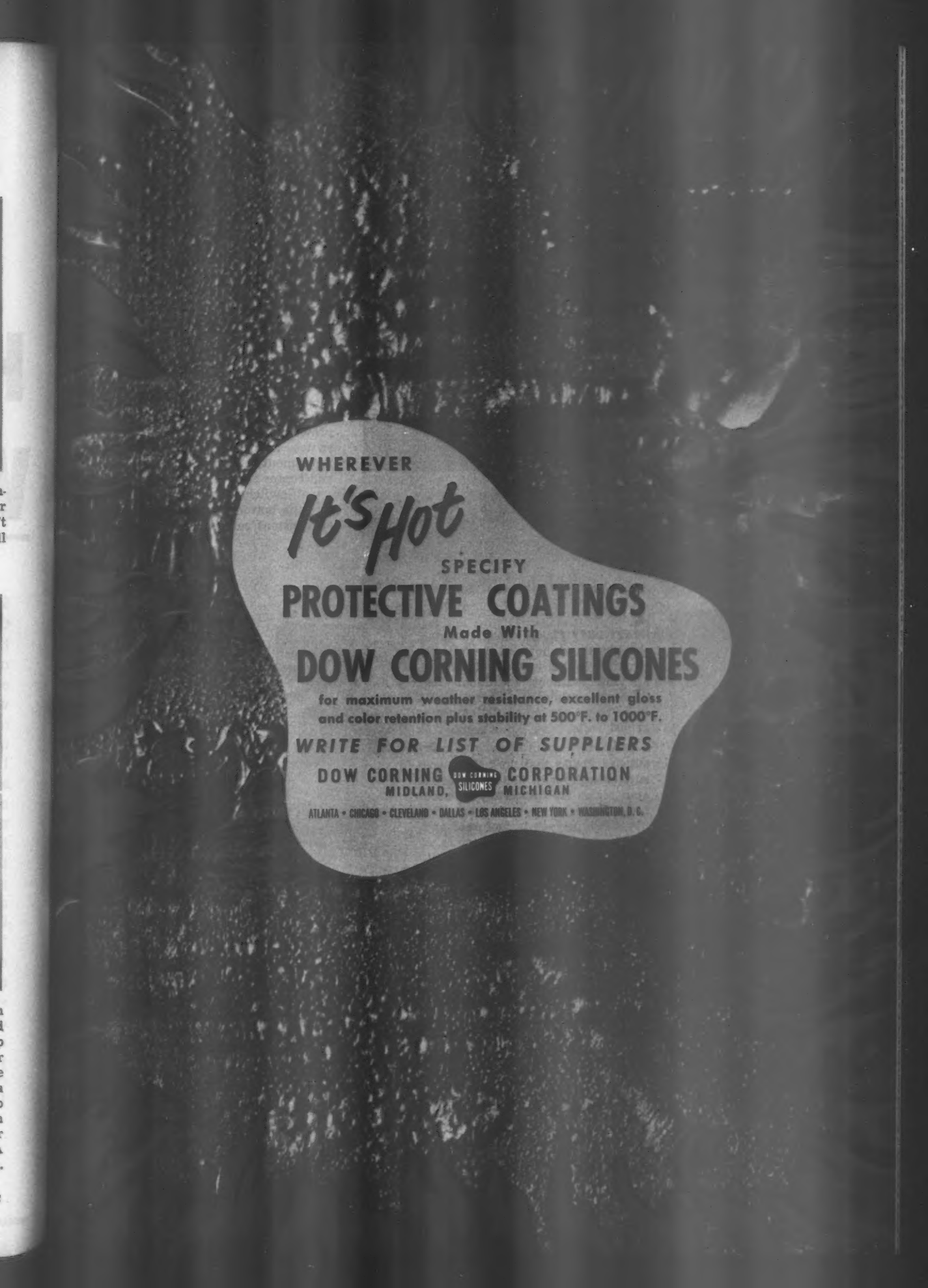
MECHANICAL CONNECTORS are being used more and more for electrical connections. They provide a tight connection between two wires, between wires and copper bus, and between flat and round copper bars. There are all sorts and shapes, to do every conceivable job. Make sure you use the right size connector for your particular job. An oversize connector will not make up properly. If the connection isn't tight, you'll get overheating. And serious trouble will be the result.

CONNECTORS for use with large wires apply pressure to the wires, tubing, etc., by means of screw bolts of various kinds. These connectors have wire sizes for which they are designed stamped on the connectors themselves. One type has collapsible contact sleeves with a long taper that provides uniform contact between the body and the wire. A tapered sleeve with fine threads insures high contact pressure between the wires. Another line obtains its high pressure by means of a hydraulic tool that clamps the wire and the connector into practically a solid mass.



SMALL WIRE CONNECTORS are usually applied with a pressure tool. A crimping tool draws the cap and the insert wires into a solid mass. An insulated cap is pushed over the connector and a threaded fiber ring screws over the cap, locking it in place. The same tool installs termination lugs. Another line uses a wedge which tightens on the wire when forced into a lug by a pressure tool. No. 14 wire and smaller can be connected by a plastic shell which screws on over the wires like a nut on a bolt (lower photograph). A new line can be used on wires carrying 1000 volts.

More on page 138


WHEREVER
It's Hot
SPECIFY
PROTECTIVE COATINGS
Made With
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for maximum weather resistance, excellent gloss and color retention plus stability at 500°F. to 1000°F.
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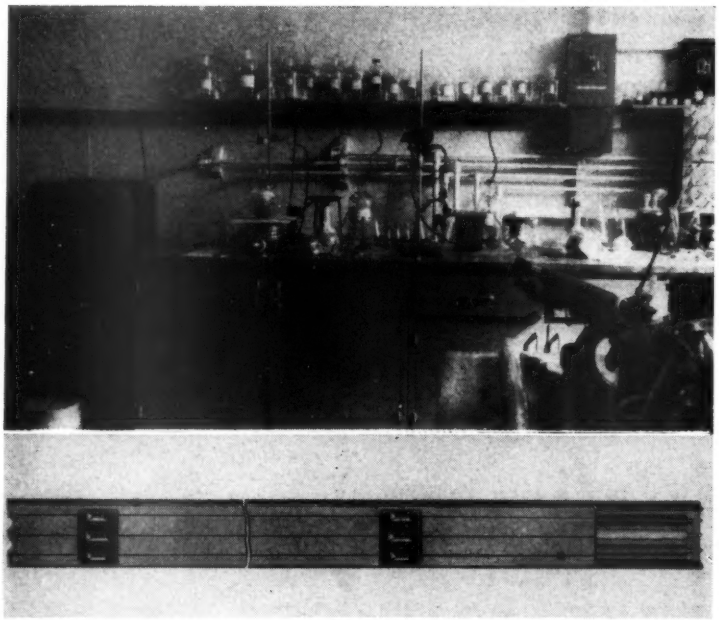
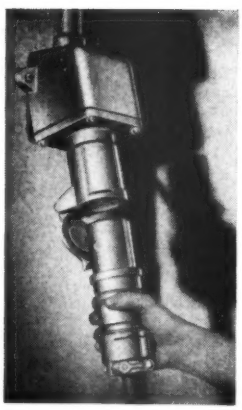
TODAY'S WIRING DEVICES . . . begins on page 130

PLUGS AND RECEPTACLES

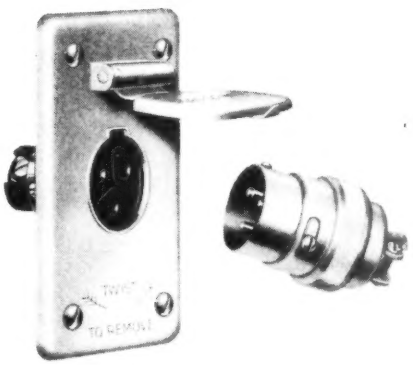


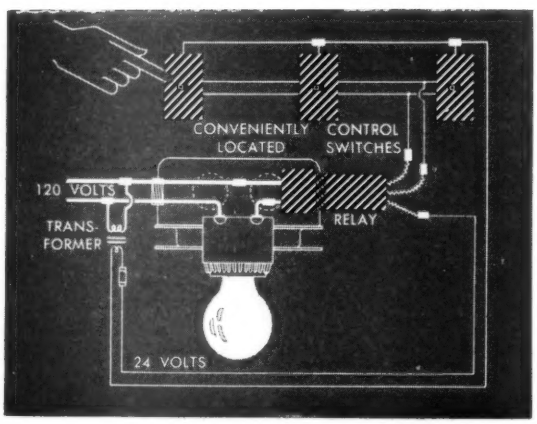
A MULTIOUTLET SYSTEM for a laboratory installation like the one shown provides for heavy electrical loading. With elbow fittings the system can be carried around obstructions without channeling into the walls. One type of raceway useful for such an installation is shown in the lower photograph. It has three-wire receptacles, so each receptacle provides two types of service: switch-controlled and constant. Equipment plugged into the top and center slots is controlled from a wall switch. Equipment plugged into the bottom and center slots is on constant service.



◀ **HEAVY-DUTY PLUGS** and receptacles like those shown at the left are circuit breaking in themselves, and are safe without additional disconnect equipment. These plugs come in ratings up to 400 amperes at 600 volts.

▶ **MIDGET PLUGS** that lock in place automatically will handle up to 15 amperes on 125 volts. They are used for all types of portable tools. The bayonet-type lock is foolproof and serves to polarize the connectors. A simple twist of the wrist unlocks it.





LOW-VOLTAGE WIRING

REMOTE CONTROL wiring systems operate at low voltage (24 volts instead of 115), save steel and copper and protect personnel. The thermoplastic insulation is sufficient; no additional protection of steel armor or conduit is required. The low-voltage control was designed originally for home lighting, but offers great possibilities for control of machine tools and safety devices where 115 volts is dangerous to personnel. The control relays handle up to 1/3 hp., 15 amperes at 125 volts, 5 amperes at 250 volts. One relay, operated by an impulse-type cam, requires only two wires for on-off control.

TODAY'S WIRING DEVICES . . . begins on page 130

PLUGS AND RECEPTACLES

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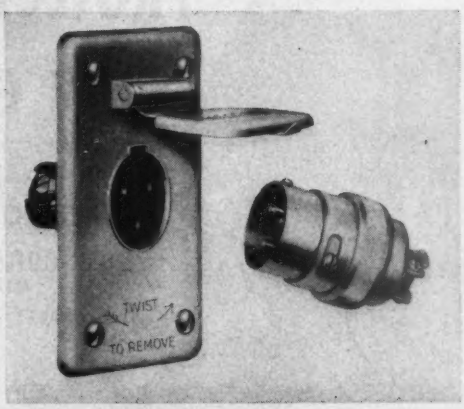

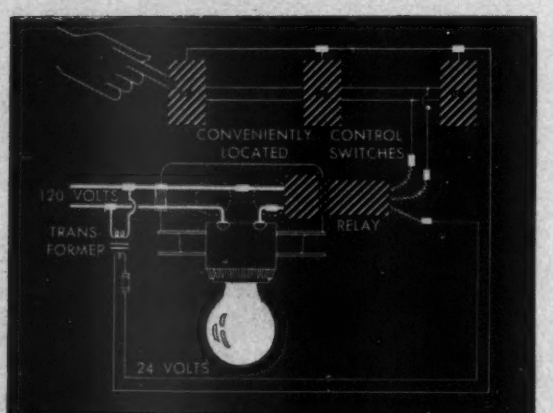

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$3,000

...for the half-hour that wasn't there

WHEN a Massachusetts company* surveyed their plant methods, they were amazed to find how much it was actually costing them to keep their machinery lubricated.

The lubrication cost was $14 every day. Added to that was the cost of the half-hour's production time lost every day while the machinery was stopped for lubrication.

This manufacturer called in an Alemite Lubrication Engineer. He recommended a system that *automatically* lubricated all the machinery . . . while it was running! The result: the lost half-hour was converted to productive time and the cost of lubrication was cut from $14 a day to only 21c a day. The total savings are over $3,000 every year.

Call Your Alemite Lubrication Engineer

No matter what size or type of plant you operate, Alemite can show you dozens of ways to save through the more efficient handling of petroleum products. Call your local Alemite Industrial Distributor now or send for the free booklet "11 Ways to Cut Production Costs." Simply attach the coupon below to your letterhead. Dept. G-51, 1850 Diversey Parkway, Chicago 14, Ill. *Name on request

ALEMITE

MEANS EVERYTHING FOR LUBRICATION

1. Methods 2. Lubricants 3. Equipment

Another Product of Stewart-Warner

Alemite Cuts Costs 3 Ways

1. In transferring lubricants . . . cuts man hours 63% for every 100 pounds transferred. Eliminates mess, costly contamination.

2. In loading grease guns . . . saves 3¾ man hours for every 100 pounds of lubricant loaded into hand guns.

3. In applying lubricants . . . saves up to 23.9 man hours for every 100 pounds of lubricant applied to bearings.

FREE! Valuable Booklet—

"11 Ways to Cut Production Costs"...

(Simply attach to your letterhead)

ALEMITE, Dept. G-51
1850 Diversey Parkway, Chicago 14, Ill.

We'll include facts on the new Alemite Oil-Mist System, too—(OIL-MIST atomizes oil into mist, circulates it to bearings under pressure. Increases life of bearings as much as 17½ times).

*Name*_____

*Company*_____

*City*_____ *State*_____

MAINTENANCE POINTERS

FOR PLANT OPERATING EXECUTIVES

Timber panels provide smooth crossing for Mathieson.

Smooth-as-Silk Roadway, Even for Lift Trucks

Grade crossings inside industrial properties are usually rough going. Particularly for a lift truck.

But not any longer at the Mathieson Chemical Corporation in Saltville, Va. In the photograph you can see why. This is one of the company's three crossings that it recently repaired with Koppers pressure-creosoted timber panels. There's no uneven, bumpy road surface here. These are prefabricated, resist decay, and won't deteriorate by sagging, washboarding, or disintegration. If the track needs repair, you can easily remove and replace panels without damage. Mathieson's own employees installed the crossing, without a crane.

Here's Longer Life for Transformer Oils

If you have oil-filled transformers, you know that the oil may go bad after a while. It picks up some moisture and oxidation takes place with the formation of sludge, among other things. That commonly results in lower capacity for heat transfer, deterioration of the insulation, and a decrease in the insulating properties of the oil. Then the oil has to be treated to restore it to somewhere near its original condition.

This problem isn't a new one. Efforts to solve it have taken two general directions: (1) Use of some device on the transformer to prevent contact of oil and air; (2) adding an inhibitor to the oil.

An inhibitor called Impruvol 20, which has recently been made available for treating transformer oils has given interesting results under extensive tests. Results of tests indicate that:

1. Addition of 0.5% of this inhibitor to new transformer oils increases their stability to oxidation from four to eight times.
2. No undesirable results were noticed when different transformer oils were mixed and treated with the inhibitor.
3. When the inhibitor was added to used transformer oils treated with clay the life under test was considerably increased. It was less, however, than that of new oils containing the same amount of inhibitor.
4. The inhibitor increased the test life of mixtures of new and reclaimed transformer oils from 10 to 15 fold.

For more information on Impruvol 20, ask the Koppers Company, Inc., Chemical Division, Pittsburgh 18, Pa., for a copy of Bulletin C-O-140.

Using a meter to test for explosive atmosphere.

How to Protect Welders in Explosive Atmospheres

See how it's done at the Jos. S. Finch & Company distillery at Schenley, Pa. Because explosive alcohol vapors are present in many departments, the electric or torch welder has to get a permit from the captain of the plant police force on every job.

A plant guard goes to the job site with fire extinguishing equipment. He tests the atmosphere with an Explosimeter (made by Mine Safety Appliances, Pittsburgh) for presence of an explosive

More Maintenance Pointers on page 142.

REDUCE
Your Stocks
SIMPLIFY
Maintenance

WITH

FIG. 2150
150 LBS. S.P.
DOUBLE WEDGE DISC
RISING STEM

LUNKENHEIMER INTERCHANGEABLE BRONZE VALVES

Threads and parts of the Fig. 2150 series are designed so that you can interchange bonnets and trim in seconds. Just spin the threads together, tighten, and your *converted* valve is ready for the toughest 150-lb. service.

This feature of simple conversion lets you *reduce* your valve inventory. Figure 2150 is a double-wedge disc, rising stem design. Figure 2151 has a solid wedge disc and rising stem. And Figure 2153 is a single wedge disc valve, of non-rising stem design. Bodies are the same for all three. With only a few valves in stock, you're ready to meet *any* maintenance problems, because you can interchange trim to suit the service . . . and provide new parts as you need them.

Avoid costly "downtime" by stocking Lunkenheimer 150-lb. bronze valves, available in sizes from ¼ in. to 3 in.

Ask your distributor for Circular 574, describing the complete Fig. 2150 series, feature by feature. Or write The Lunkenheimer Co., Box 360L, Cincinnati 14, Ohio.

FIG. 2151
150 LBS. S.P.
SOLID WEDGE DISC
RISING STEM

FIG. 2153
150 LBS. S.P.
SINGLE WEDGE DISC
NON-RISING STEM

BRONZE • IRON • STEEL

LUNKENHEIMER
THE ONE *Great* NAME IN VALVES

L-351-14

MAINTENANCE POINTERS

Begins on page 140

mixture. Only when he finds from his instrument tests that the atmosphere is safe will he grant permission to weld. His word is final.

He stays at the job during welding operations, and makes tests at frequent intervals. After the welder is finished, and the metals are still hot, he makes periodic tests as an extra precaution.

Getting Ready for a Plant Vacation?

It may seem a bit early to talk about, but that July vacation shutdown is only weeks away.

There will be lots of preparations made for work for some unlucky maintenance crews—jobs of alterations, overhauls, and repairs that just can't be done any other time. There's one preparatory job *all* plants should do, and all too often don't do. It's the job of fire prevention.

Last year when the GE Erie Works closed down, the assistant manager briefed all shop superintendents on necessary measures, two weeks ahead of the shutdown. They, in turn, instructed their foremen. Safety men made the round to check equipment using flammable materials and to make sure all combustible wastes were removed.

These preparations didn't overlook the employee. He was told by his foreman of the importance of leaving his place of work clean and safe. And he got the same message pounded into him by plant publication and posters.

One of the forceful posters was entitled "We're Going on Vacation . . . Leave the Plant Fire-Safe." It stressed the need for clean work areas. If you want to use this poster, write Associated Factory Mutual Engineering Division, 184 High Street, Boston 10, for a sample. You can buy quantities on application.

You'll Like This CMP for Rubber

It's the "Conservation Maintenance Plan" offered free to all industrial plants by Quaker Rubber Corporation, Philadelphia 24. Purpose is to show you how to get the most out of the rubber products you already have or can get.

The plan includes a handbook, wall charts, and monthly bulletins dealing with conveyor belting, flat transmission belting, V-belts, hose, and packings. You'll find tips on how to select these products for best service, plus installation instructions, and do's and don'ts for maintenance.

Proper selection, installation, and maintenance, says Quaker, all team up to extend the life of industrial rubber products, hence you will need fewer of them.

Don't Read This If You're Not a Plant Engineer

Is there a plant engineer who breathes the air of industry and never has said: "Deliver me from those Monday morning quarterbacks!"

Those quarterbacks are the "amateur maintenance" fellows, of course, who golfed all day Sunday while you were sweating out a plant relayout, a tough repair, or a tricky new installation. They think because they can drive a nail, paint a bathroom, or fix a light socket they are expert mechanic and chief electrician combined. So on Monday morning they look the job over and stalk into the plant engineer's office to tell him how they would have done it.

Well, here's a suggestion from one of our good subscribers on how to squelch those pseudo-engineers. It's a motto you can put on your desk, or hang it so that it's the first thing that catches a man's eye coming into your office. It reads: THOSE WHO CAN—DO. THOSE WHO CAN'T—CRITICIZE. Have you any better ideas?

Want to Keep Little "Floor-Aches" From Becoming Big?

Consider the lowly, downtrodden plant floor. A good floor surface is one of the least appreciated but most used, and sometimes abused, items of plant property.

Floor maintenance, any plant engineer will agree, is a never-ending job. Trouble is, other jobs usually look more important, and first thing you know, you don't get to the floor until it's a major repair job.

Here's a plan one company uses to keep down repair costs. Every time the maintenance foreman or safety engineer spots a potential "floor-ache," he circles it with bright yellow crayon. It's a danger signal you can see yards away. Subsequently, in his weekly plant tour the plant engineer lists all the trouble spots and gets out a repair order. You can be sure these yellow "tags" don't stay there long. If they do, try dating them, and you'll know who's to blame for inaction.

"Big Ones, Little Ones— *All* Tanks Are Dangerous"

This is the warning headline of one of the 48 pages in Du Pont's pocket-size booklet, "TANK TALK." Purpose was to stimulate safety among men who enter and clean gasoline storage tanks. It makes good reading for men who supervise cleaning of any tanks likely to contain explosive or toxic vapors or sludge. And it's easy reading, too—brief and to the point—with lots of sketches that ram the point home. Copies are free. Write Petroleum Chemicals Division, Du Pont Co., Wilmington.

And while we're on this subject of tanks you can now get the new safety code for "Ventilation and Operation of Open-Surface Tanks." Write for code Z9.1-1951 from American Standards Association, 17 E. 45 St., New York 17.

Keep your eye on V-P-I WHEN SELECTING BLOWERS

CENTRIFUGAL

Motor-driven Type OIB Centrifugal Blower in chemical processing plant. Capacity 19,000 cfm.

Wet bark is blown 400 feet, from charger to stoker, by R-C Rotary Positive Blower in this Nova Scotia paper mill.

ROTARY

You can't afford to risk shutdowns today because of unsatisfactory or inadequate equipment performance. To keep production moving at the required fast pace, calls for blowers or gas pumps that continuously deliver positive Volume at required Pressure—and at Low power costs to reduce operating expense.

You get these 3 essentials from R-C Blowers and Gas Pumps. Whether your needs call for Centrifugal or Rotary Positive units, we can match them from our exclusive *dual-ability line*. With capacities from 5 cfm to 100,000 cfm, you can usually find R-C units that closely fit your demands, with resultant savings in time, cost, space, weight and power.

From an experience of almost a century of blower building, our engineers will gladly make suggestions of the right R-C equipment to move or measure gas and air to keep production going.

ROOTS-CONNERSVILLE BLOWER CORPORATION, 510 Central Avenue, Connersville, Indiana.

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

WHAT'S NEW IN EQUIPMENT... BRIEFED HERE

AIR CONDITIONING 170

AUXILIARY EQUIPMENT 172

ELECTRICAL EQUIPMENT 178

LIGHTING 184

MAINTENANCE TOOLS & SUPPLIES 186

MATERIALS HANDLING ..... STARTS HERE

MEASURING & CONTROL APPARATUS 190

VALVES, PIPING, & ACCESSORIES 194

IN THE NEXT ISSUE

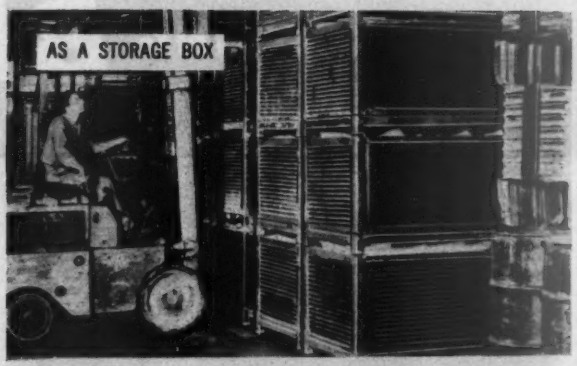
Better Product, Longer Tool Life • That's the claim of the makers of the Will-Cool cooler—a compact refrigerator that takes the heat out of machine tool cutting oils. You can adapt Will-Cool to a wide range of cutting tools and oils, increase machine productivity to the full capacity of the prime mover.
B. S. Williams Co., Inc., 6 North St., Mount Vernon 1, N. Y.

Coordinate Your Clocks, Recorders, Buzzers in one time control unit. The Master Pro program timer will handle up to six circuits on any timing schedule between one minute and one week. It will control manufacturing processes and equipment, too.
Cincinnati Time Recorder Co., 1732 Central Ave., Cincinnati 14, Ohio

Clean Dusty Stockbins, Linty Machines with this hand vacuum cleaner—even where explosive atmospheres would ordinarily present a hazard. There are no electrical connections, no moving parts. The cleaner operates on compressed air.
Syntron Co., Homer City, Pa.

Bend Light Gage Tubing to almost any shape with the Tal 3-in-1 bender. It handles $\frac{3}{8}$-, $\frac{1}{2}$-, and $\frac{5}{8}$-in. O.D. tubing, makes perfect offsets and bends up to 180 degrees.
Tal Bender, Inc., 417 N. Water St., Milwaukee 2.

Seal Engine and Compressor Pistons with a one-piece sealing ring that has its sealing member on the inner side of the ring only. This Inseal minimizes wear on cylinder walls, permits the use of stronger sealing members.
Double Seal Ring Co., Fort Worth, Texas

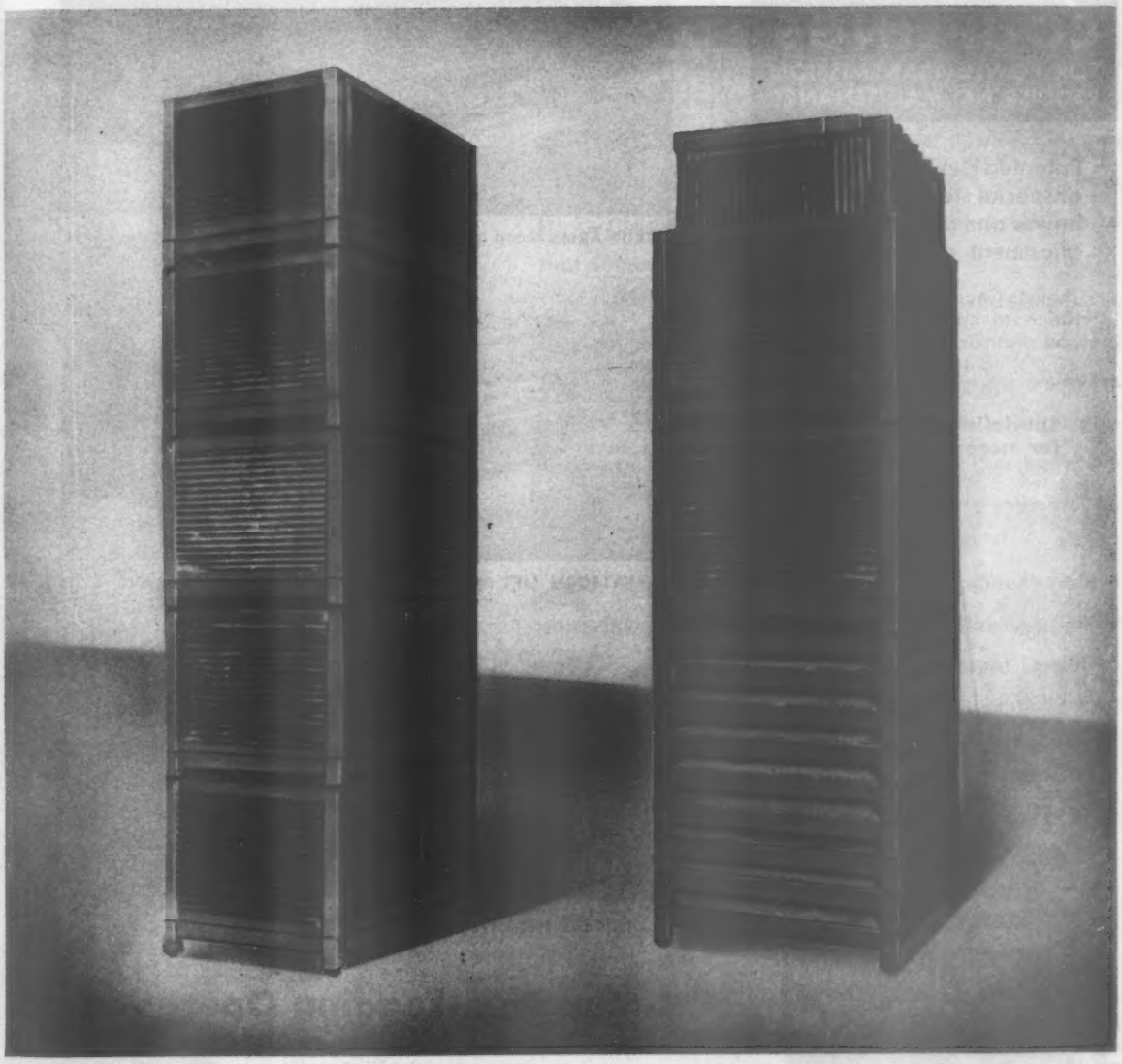


IN THE PLANT the Hazen box is a versatile performer. Whether in storage or in handling operations, you can speedily remove sides and ends to suit the work.

Wide Range of Jobs

YOU CAN USE the Hazen Knock-Down box in enough different ways to make it a versatile performer on almost any materials handling team. Each box has five interlocking parts—two ends, two sides, a pallet-type base.

You can easily arrange these parts in various combinations to form storage boxes, end skids, 3-sided bins, and 8-way pallets. Nesting end caps let you stack loaded Hazen boxes five or six high, carry three at a time by fork



IN SHIPPING the Hazen box is a real space and labor saver. You can safely stack loaded boxes in compact tiers without using load binders or blocks. Return shipping costs of the empty boxes are cut to the bone, too. Space comparison above shows 5 full boxes on the left, 11 empty and collapsed ones stacked in a compact pile on the right.

Handled by Knock-Down Boxes

lift truck. Their flexibility doesn't end there. You can assemble or dismantle the boxes in about 30 seconds—without tools. Sides and ends just snap into place. You can double the capacity of one unit simply by adding another set of sides and ends.

A Hazen box with sides removed will still support loaded boxes on top of it. So you can improvise storage shelving with these units in a matter of minutes.

And you save space in storing empty boxes. The sides and ends of nine boxes can be packed into two other boxes. These two boxes and the remaining nine bases can then be tiered in one space-saving pile (see above).

Available with corrugated steel, wire mesh, or canvas sides. Steel box has capacity of 4000 lb.

Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4.

More on next page

THOMAS

Flexible ALL METAL COUPLINGS

FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:

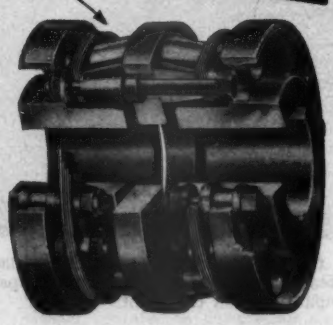
½ to 40,000 HP
1 to 30,000 RPM

Specialists on Couplings for more than 30 years

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated

Lubrication is not required!

PATENTED FLEXIBLE DISCS



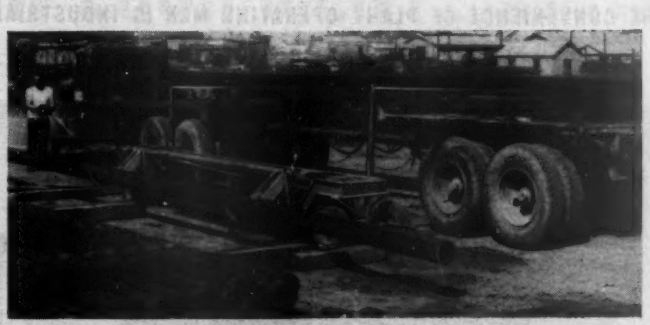
THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

NO MAINTENANCE PROBLEMS.

ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA



PICKUP ARMS scoop up a heavy section of pipe, roll it onto a . . .

. . . **PLATFORM LIFT** against guide posts. Lift raises pipe to . . .

. . . **DELIVERY HEIGHT,** where it rolls off onto truck in a . . .

1-Man Pipe-Loading Operation

LOADING HEAVY PIPE sections or bar stock onto trucks and flat cars can be a dangerous job. With ordinary methods it's at best a time-consuming one. But the Pridy Straight-Lift pipe loader makes it a simple 1-2-3 operation. The Pridy method is quick—17 seconds from pickup to delivery—and it's safe—the operator controls the work at a safe distance.

Pipe or bar stock to be loaded is lined up on wooden skids. Then in one continuous cycle a section of pipe is scooped up onto an elevating platform, raised to the desired height, and rolled off into place on the top of the pile. The platform is slanted so that the pipe rests securely against the vertical guide posts and rolls off in the right direction at the top. One man with rope controls operates the machine from a safe vantage point.

The Pridy loader will lift a 4000-lb. load to a maximum height of 11½ ft. Collapsible guide posts can be adjusted to desired height. The unit is powered by a gasoline engine, but is also equipped for tow operation.

Republic Supply Co. of Calif., 1753 Workman St., Los Angeles.

More on next page

MOVING SOMETHING* *from* HERE

The other day someone asked us what Jeffrey did. Quick as a flash we said: "If you have something to move from here to there, we can do it." Yes, and all sorts of devices with which to do it. Besides, we can process it (cool, dry, screen, feed, pack and elevate it) . . . reduce it, if necessary, to desired fineness so that something else may be done with it.

Material handling, processing and reducing . . . that's our business. That's where we can be of real service to you. Jeffrey builds many types of conveyors —some that cannot be found elsewhere—bucket elevators, feeders, packers, dryers, coolers, screens, bin valves, chains of all kinds, crushers and pulverizers, car pullers, transmission machinery, etc.

Our engineers know a great deal about modern material handling methods and reduction machinery . . . know how to fit them into your plant layout to provide fast, straight-line production . . . more profit for you. Convey your problem to them and let them give you a lift.

SOMETHING takes in a lot of territory. But Jeffrey has a diversified line just as there are many kinds of material. Whether it's loose bulk or packaged, we can speed it on its way—at minimum cost and to your complete satisfaction.

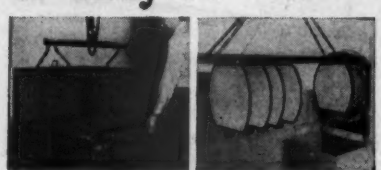
to **HERE**

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

Why look further for special metal assemblies? Call *Cambridge* your approved source for properly designed crates, trays, baskets, racks or fixtures--expertly fabricated from any metal or alloy...



for processing your products or materials, in bulk, through liquids, heat, gases or corrosive agents.

Submit your own blueprints for quotation, or merely give us the details of the process for which the assembly must be designed. Our trained engineers and metalworkers will do the rest.

Look under "Baskets—Wire" in your Classified Telephone Directory to call your Cambridge Field Engineer, or write direct.

Ask for FREE folder describing Cambridge facilities for special metal fabrications.

The Cambridge Wire Cloth Co.
Dept. E · Cambridge 5, Md.

WIRE CLOTH · METAL CONVEYOR BELTS · SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

NEW HANDLING EQUIPMENT

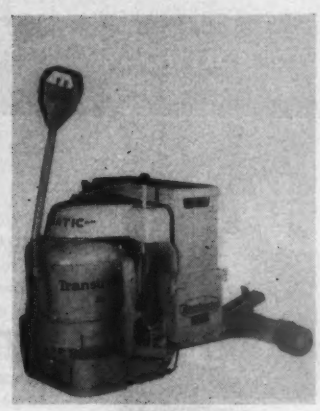
All-Purpose Shovel for Fork Trucks

The Clark people have a new bagful of accessories to increase the range of fork lift truck performance. Best of the lot is the all-purpose hydraulic shovel shown above. Clark has designed it for the efficient moving and loading of bulk materials such as gravel, coal, scrap, small stampings, etc. You can tilt the shovel up through a 40-deg. angle, dump at 45-deg. angle.

Other attachments include a double clamp for lifting two drums at a time, a clamp for handling bales and large bulky loads, and a fingerlift attachment for large, open-sided crates.

Clark Equipment Co., Battle Creek, Mich.

TRANSTACKER



TRANSTRACTOR

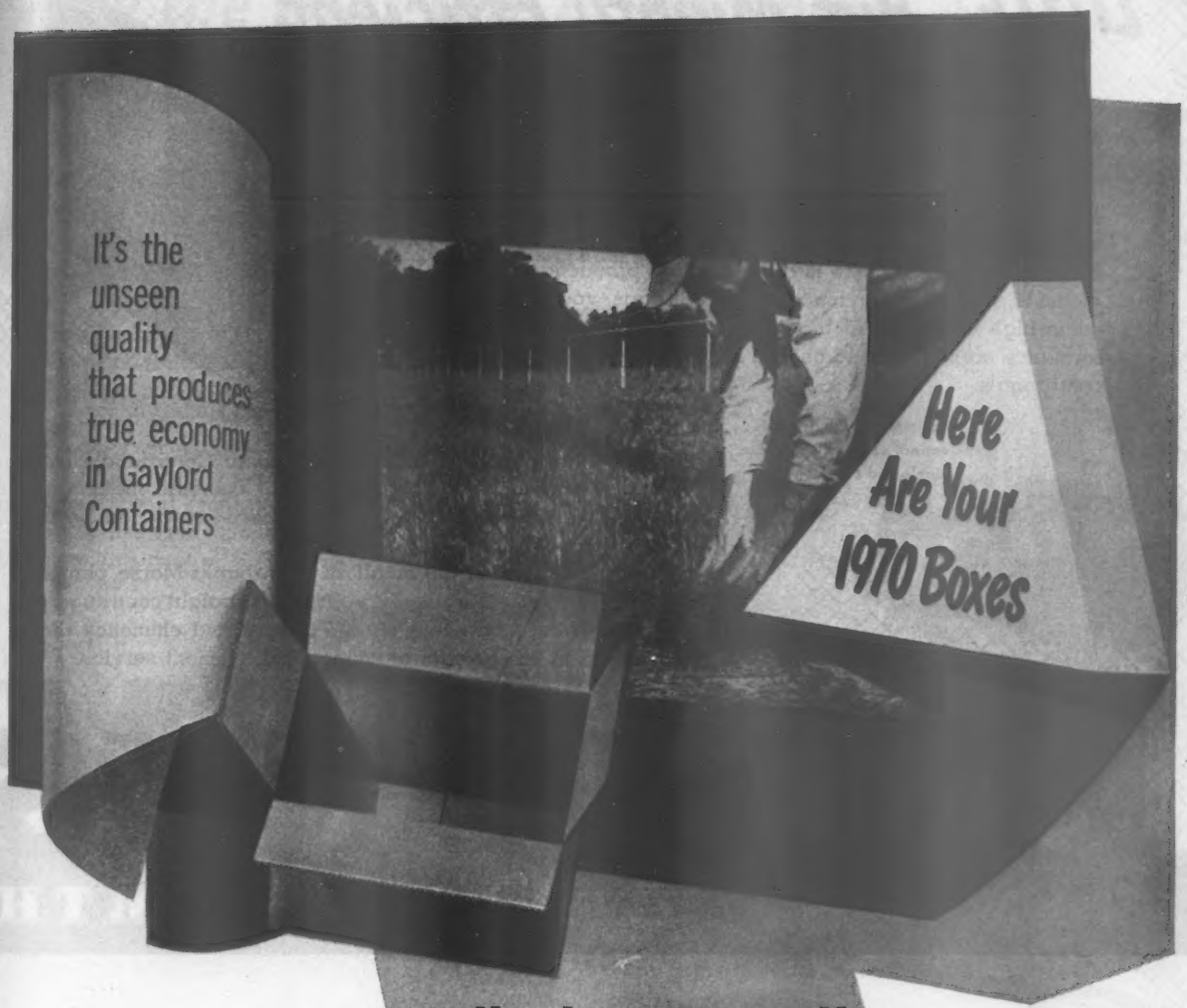
Shorter Trucks Handle Skid Loads

Automatic Transportation has cut down on the size of its skid handling equipment. The new electric Transtacker for tiering and moving dead skids has an over-all length of 69¾ in.—10 less than previous models. Improvements include increased protection for all operating parts and better weight distribution. Two models—4000- and 5000-lb. capacity—have a 70-in. lift, an 83-in. mast.

For moving live and semi-live skids there's a battery-powered Transtractor six inches shorter than its predecessor. Specially designed rear frame for the trailing wheels is said to facilitate sharp turns. Lifting arm is positioned so as to make full use of skid weight in increasing drive traction.

Automatic Transportation Co., 149 W. 87th St., Chicago.

More on page 154



Talk about control!

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS
KRAFT BAGS AND SACKS
KRAFT PAPER AND SPECIALTIES

From the moment the seedling is planted by Gaylord foresters until the shipping container is delivered, every step in growing and manufacturing is supervised by Gaylord specialists. It's this kind of experienced control that enables Gaylord to build boxes of unsurpassed quality for many of the country's largest users.

Gaylord Boxes

262

GAYLORD CONTAINER CORPORATION
General Offices: **ST. LOUIS**

New York • Chicago • San Francisco • Atlanta • New Orleans • Jersey City • Seattle
Indianapolis • Houston • Los Angeles • Oakland • Minneapolis • Detroit • Columbus
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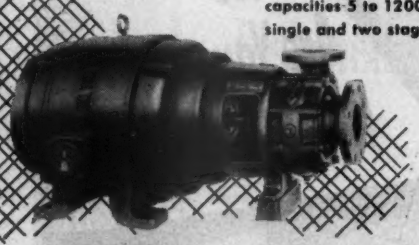
LITTLE...But Mighty Efficient

If your pump requirements call for a small to moderate size pump, you'll find the efficient, economical answer in the Fairbanks-Morse line.

Take Figure 5530 Side-Suction Centrifugal Pumps, for example. These compact, sturdy pumps are highly efficient, yet they're economical both in first and operating costs. Because Fairbanks-Morse is able to apply production line methods, with precision machining of all parts, you get the same high standards of material, workmanship and performance normally found only in highest quality split-case centrifugals.

Side-Suction Centrifugals . . . capacities 25 to 3000 g.p.m.

Builtogether Centrifugals . . . capacities 5 to 1200 g.p.m., single and two stage.



Or take Fairbanks-Morse Builtogether Centrifugals . . . the exceptionally compact units that combine motor and pump in one efficient unit. These space-savers can be installed in virtually any position.

Or take any of the small size Fairbanks-Morse pumps. Rotary, Westco Turbine Type, or small straight centrifugals. You get the same "big pump" quality and efficiency that pay off in more years of economical, efficient service.

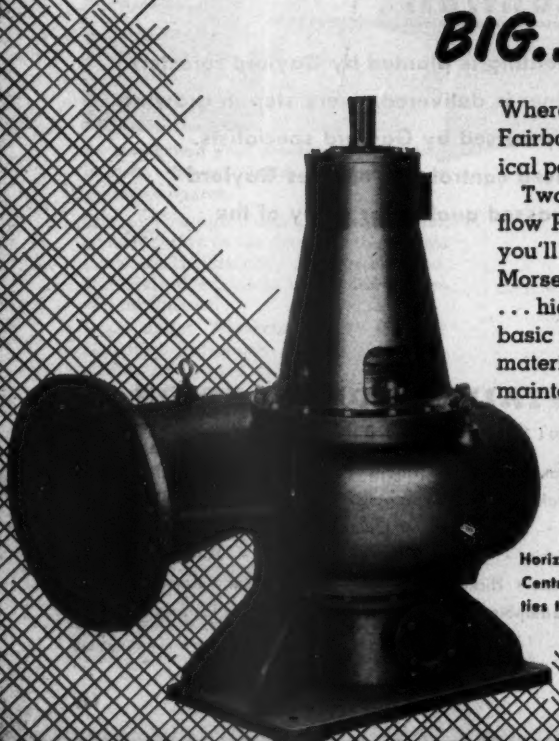
FAIRBANKS-

A NAME WORTH R

BIG..But Low in Operating Costs ...

Where pumping requirements demand big capacity pumps, again Fairbanks-Morse can answer your needs for more efficient, economical performance.

Two-Stage, Split-Case Centrifugals, Horizontal and Vertical Angle-flow Pump, Deepwell Turbine Pumps, Vertical Propeller Pumps . . . you'll find the pump that exactly fits your needs in the Fairbanks-Morse line. Whatever the characteristics of the particular service . . . high or low head . . . capacity . . . efficiency . . . wet or dry pit . . . basic water supply, booster service . . . transfer service . . . or liquids material handling . . . you'll get the service you want at minimum maintenance and operating costs.



Horizontal and Vertical Angle-flow . . . capacities to 100,000 g.p.m.

Horizontally Split-Case Centrifugal . . . capacities to 50,000 g.p.m.

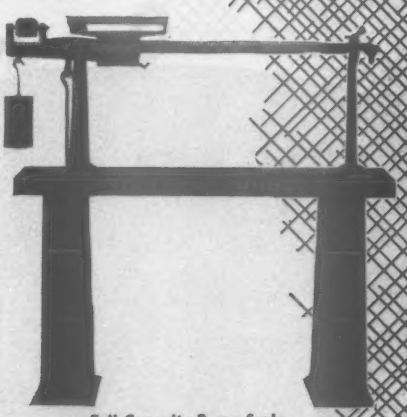
Deep Well Turbine . . . capacities to 10,000 g.p.m.

Take the WAIT Out of Weighing Whether It's a Beam Scale..

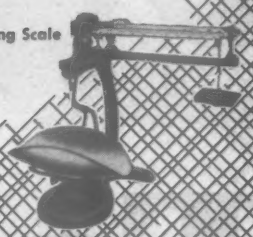
You can weigh fast *and accurately* with a beam scale . . . if it's Fairbanks-Morse. These efficient weighing instruments were designed for easy-reading and accurate weighing.

All poises on Fairbanks-Morse Beam Scales are center indicating, full open face. Large, easily readable figures on face plates are set at a 45 degree angle to assure fast, easy reading . . . regardless of the height of the weigh-man! These Fairbanks-Morse advantages mean less chance for costly human errors . . . less "waiting on weights" . . . faster operation.

Fairbanks-Morse Beams can be furnished as standard, full capacity, or as Type-Registering with weights are printed on a card for accurate records. Beam counting scales are also available to count accurately *by weight*, small parts or pieces. Counting scales save time, money and are an essential aid in accurate inventory control.



Full Capacity Beam Scale



Beam Counting Scale

Type Registering Beam Scale

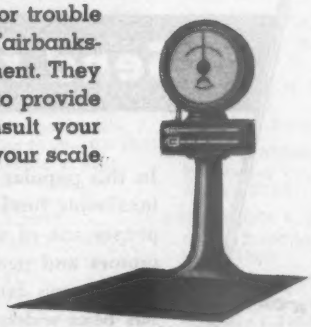
S-MORSE

H REMEMBERING

...OR A Dial Scale

Fast, enduringly accurate Fairbanks-Morse Dial Scales speed and simplify industrial weighing wherever they are used. Basic simple design, with an absolute minimum of moving parts, assures less chance for trouble . . . less chance for inaccuracies. There is a Fairbanks-Morse Dial Scale to fit any weighing requirement. They can be equipped with Printomatic Recorders to provide an accurate printed record of weights. Consult your Fairbanks-Morse weighing expert regarding your scale needs.

Portable Dial Scale



Platform Dial Scale

Bench Dial Scale

See next page for Fairbanks-Morse Sales Centers

FOR PROTECTION

AGAINST DUST, DIRT, ABRASIVES, STEAM, FUMES, ETC.

New Fairbanks-Morse Type QZE, Frame 284 Motor. Also available in smaller frame sizes.

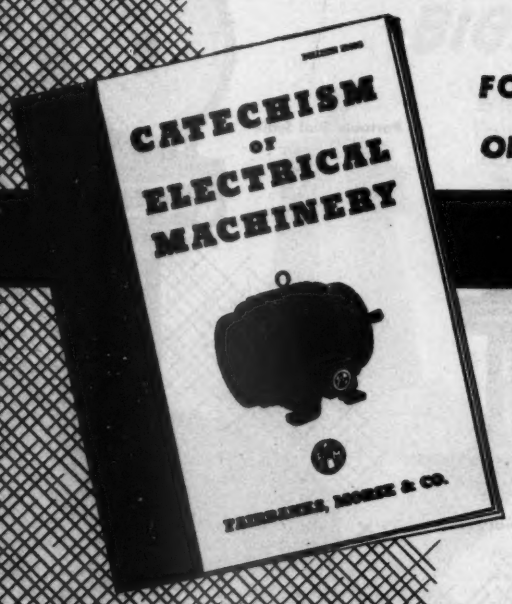
FAIRBANKS-MORSE

Totally Enclosed, Non-Ventilated Motors

For the toughest operating conditions, here is the newest development in totally enclosed, non-ventilated motors, Fairbanks-Morse Type QZE Motors are now available in Frame 284—delivering 7½ hp. at 1800 r.p.m., 5 hp. at 1200 r.p.m—filling a long-standing need for this type and size of motor. New features that assure cool, long-running service include a unique end-bell construction with cooling fins for efficient heat dissipation—and for safe, uniform, internal temperatures. For the full story on the new dependability this class of QZE Motors can bring to your most severe motor jobs, ask your Fairbanks-Morse motor representative or write Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois.

FAIRBANKS-

A NAME WORTH



FOR INFORMATION

ON DESIGN AND USE OF ELECTRIC MOTORS

Send for This Manual!

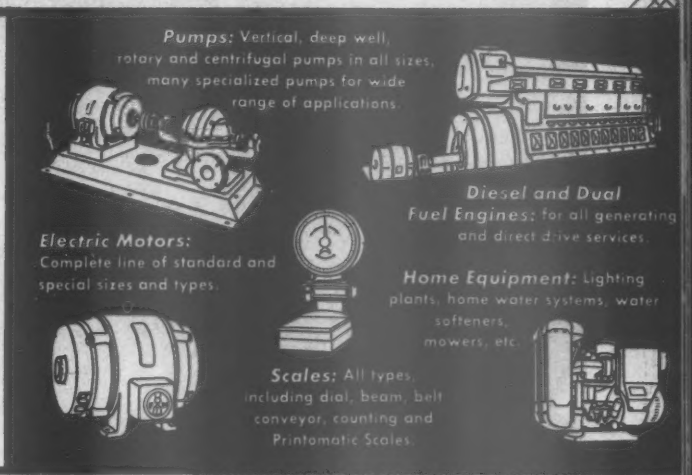
In this popular "Catechism of Electrical Machinery," you'll find an invaluable fund of basic information on the design, performance and proper use of the common types of alternating and direct current motors and generators. Primarily intended for training those who are not too familiar with electrical phenomena or terminology, it has been widely accepted by engineers, designers, and others as an aid in instruction of new men. It can be especially useful now, during this period of expanding and shifting employee rolls. Write your nearest Fairbanks-Morse Sales Center for your copy.

FOR ACTION

CALL YOUR FAIRBANKS-MORSE SALES CENTER

You can minimize procurement problems these days by depending upon your local Fairbanks-Morse Sales Center as a common source for the bulk of your requirements for electric motors, pumps, scales and diesel engines.

Fairbanks-Morse Sales Centers are staffed by factory-trained sales and service engineers who offer prompt and valuable application assistance for all Fairbanks-Morse products—as well as fast repair parts service to keep your old equipment going at top efficiency. For where to call—see the list below.


Pumps: Vertical, deep well, rotary and centrifugal pumps in all sizes, many specialized pumps for wide range of applications.
Diesel and Dual Fuel Engines: for all generating and direct drive services.
Electric Motors: Complete line of standard and special sizes and types.
Home Equipment: Lighting plants, home water systems, water softeners, mowers, etc.
Scales: All types, including dial, beam, belt conveyor, counting and Printomatic Scales.

FAIRBANKS-MORSE

REMEMBERING

THESE ARE YOUR FAIRBANKS-MORSE SALES CENTERS

ATLANTA 3, GEORGIA
760 Lee St., S. W.
AMhurst 7701

BALTIMORE 18, MD.
659 E. 25th St.
BElmont 5258

BIRMINGHAM 1, ALA.
626 N. Ninth St. Zone 4
3-6546

BOSTON 10, MASS.
178 Atlantic Avenue
LAfayette 3-3600

BUFFALO 3, N. Y.
33 Franklin St.
Lincoln 4210

CHARLOTTE 2, N. C.
Liberty Life Bldg.
Room 605
6-2893

CHICAGO 5, ILLINOIS
1550 S. State St.
HArrison 7-7100

CINCINNATI 2, OHIO
49 Central Avenue
MAin 3010

CLEVELAND 14, OHIO
3000 W. 117th St.
CLearwater 1-3300

COLUMBUS 8, OHIO
1034 Goodale Blvd.
WAlnut 8581

DALLAS 2, TEXAS
1713 N. Market Street
CEntral 4347

DENVER 2, COLO.
1500 17th Street
TAbor 6241

DES MOINES 17, IOWA
2017 Dean Avenue
6-1189

DETROIT 13, MICHIGAN
11110 East Warren Ave.
VAlley 1-7100

DULUTH 2, MINN.
Board of Trade Bldg.
2-7538

HOUSTON 13, TEXAS
5521 Navigation Blvd.
WAyside 2159—(LD 506)

INDIANAPOLIS 2, IND.
1499 N. Harding St.
FRanklin 3684
ATlantic 3092

JACKSONVILLE 6, FLA.
930 East Adams St.
5-6473

KANSAS CITY 7, MO.
1300 Liberty Street
Victor 6474

LOS ANGELES 11, CALIF.
4535 S. Soto Street
JEfferson 8151

LOUISVILLE 8, KY.
2008 So. Brook St.
CAlhoun 1469

MEMPHIS 7, TENN.
676 Jefferson Ave.
5-1614

MILWAUKEE 3, WIS.
404 N. Plankinton
DAly 8-0180

MINNEAPOLIS 15, MINN.
417 S. Fourth Street
MAin 4353

NEW ORLEANS 13, LA.
1000 St. Charles Ave.
RAymond 3115

NEW YORK 4, N. Y.
80 Broad St.
HAnover 2-7470

OMAHA 8, NEBRASKA
902 Harney St.
ATlantic 3122

PHILADELPHIA 8, PA.
401 N. Broad St.
WA 2-4100

PITTSBURGH 24, PA.
4301 Main Street
SCheniey 1-3123

PORTLAND 14, OREGON
105 S. E. Taylor St.
EAst 0131

PROVIDENCE 3, R. I.
187 Pine Street
GAspee 1-1531

ST. LOUIS 2, MO.
217 South Eighth St.
CHestnut 7483

ST. PAUL 1, MINN.
220-26 E. Fifth Street
GArfield 4335

SALT LAKE CITY 1, UTAH
153 W. Second South St.
3-2108 & 3-5139

SAN FRANCISCO 7, CALIF.
630 Third Street
EXbrook 2-5855

SEATTLE 99, WASH.
Salmon Bay Terminal
ALden 6600

STUTTGART, ARK.
403 South Main St.
185

TULSA 3, OKLA.
1335 Hunt Bldg.
3-8231

WASHINGTON 5, D. C.
1000 Vermont Ave., N. W.
District 6694

FAIRBANKS-MORSE de MEXICO S. A.
Balderas 146, Mexico 1, D. F. Mexico
10 06 74 y 10 09 58

Export Division:
NEW YORK 4, N. Y.
80 Broad Street—HAnover 2-7470

Castings ground smooth in single-step operation

Aluminum canopy beams for Lockheed fighters finished 100% faster with new 3M Backstand Method of grinding

Linmold Company, Compton, California, reports the 3M Backstand Method has eliminated one entire grinding operation. Flash and gates on aluminum castings are now cut close with a metal saw—then ground smooth in a single step. Snagging wheels and set-up wheels are no longer needed. Grinding time is cut in half!

The 3M Backstand Method and 3M Abrasive Belts can cut finishing costs in your plant, too. And standard grinding and polishing equipment is easily and quickly converted to the new system.

Write Dept. FO-451 for your copy of "Step Up Production" book explaining this cost-cutting method. Use coupon below.

Minnesota Mining & Mfg. Co.
Dept. FM-551, St. Paul 6, Minn.
Please send me copy of "Step Up Production" booklet.
Name.....
Company.....
Address.....
City.....State.....

Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn., also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-Slip Surfacing, "3M" Adhesives. General Export: Durex Abrasives Corp., New Rochelle, N. Y. In Canada: Canadian Durex Abrasives Ltd., Brantford, Ontario.

MATERIALS HANDLING EQUIPMENT

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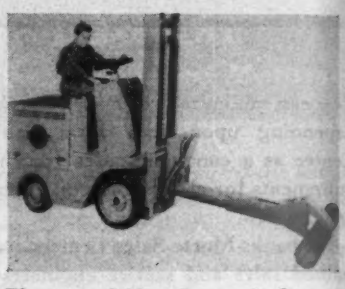


Finger Attachment for Cylindrical Stock

This fork truck attachment is said to handle heavy bar stock with the dexterity of human fingers. Although engineered primarily to handle artillery shells, it will do a job on any cylindrical object. The device grabs, lifts, and rotates cylindrical sections, places them in presses, furnaces, or racks.

The Baker shell clamp can be used interchangeably with pallet forks on the company's trucks. The clamp at the end of the 60-in. ram will handle 4-in.- to 10-in.-diameter cylinders, rotate them 90 degrees. Capacity is 500 lb.

The Baker-Raulang Co., 1250 W. 80th St., Cleveland 2.

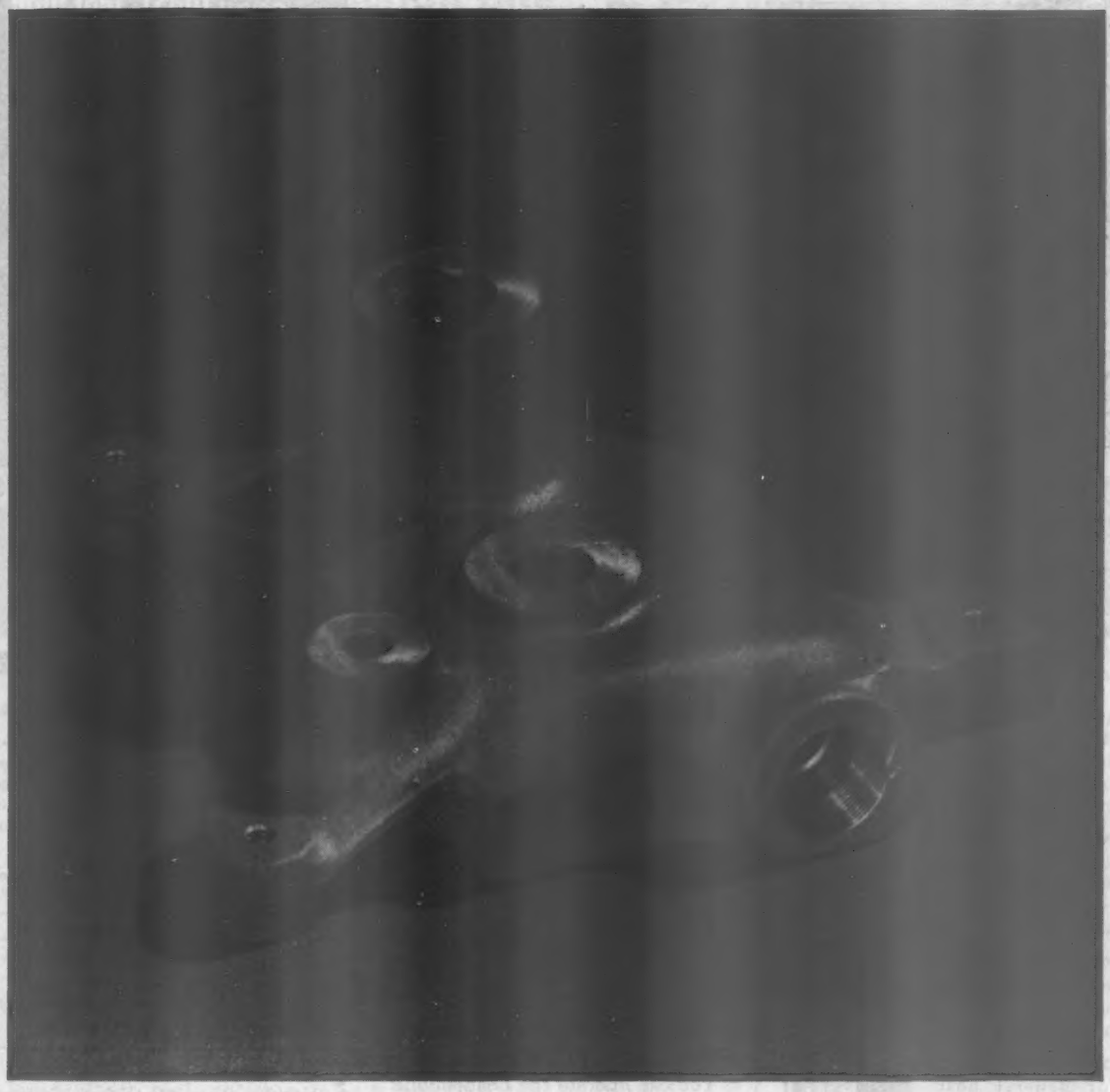
1-Ton Fork Truck Has Added Maneuverability

Shorter length, shorter width, and narrower turning radius are the features of this 2000-lb. capacity fork lift truck. You can get one with 24- or 15-in. load center. Both models are powered by gasoline engine. You have a choice of 5 standard masts—72, 84, 108, 114, or 120 inches, maximum lift. A new-design 9¼-in.-diameter clutch can be replaced without removing the transmission.

The Buda Co., 15425 Commercial Ave., Harvey, Ill.

More on next page

The ledger is red with good intentions . . .



for even the best intentions won't bring back money wasted machining imperfect castings

GE X-RAY

That's why so many leaders in industry are placing confidence in radiography. For here's a vital inspection tool, which permits detection of internal discontinuities prior to finishing operations . . . before the ledger grows red with expensive machining.

As an inspection device, industrial x-ray is often a non-destructive substitute for physical test and sectioning. But its applications are far broader. In fact, industrial x-ray has become a *development* tool. An instrument that not only diagnoses, but suggests treatment as well. It shows where savings can be made, designs improved, new techniques developed.

Chances are, there's a place for industrial x-ray in your business. Write for booklet "Industrial Applications of the X-Ray." General Electric X-Ray Corporation, Dept. AC-5, Milwaukee 14, Wisconsin.

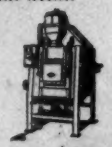
GENERAL ELECTRIC
X-RAY CORPORATION

'Surface'

STANDARD RATED FURNACES for TOOL ROOMS

THIS INFORMATIVE FOLDER Bulletin SC-123, is fully descriptive of 'Surface' Standard Furnaces' application to tool room heat treat needs.

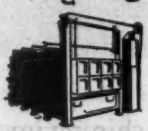
ATMOSPHERE FURNACES
Balco, Char-Mo, Atmotrol for clean, scale-free heat treatment.



MUFFLE FURNACES
for use with protective atmospheres to prevent scaling and decarburization.

POT FURNACES
for drawing, cyaniding, liquid carburizing, or quenching.

OVEN FURNACES
for general heat treating or heating operations. Direct fired.

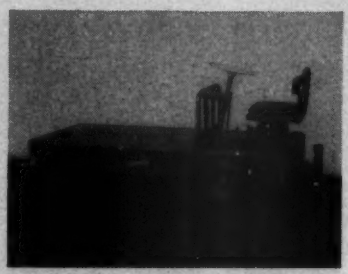


CONVECTION FURNACES
for drawing or tempering of tool steels.

SURFACE COMBUSTION CORPORATION
TOLEDO 1, OHIO

MATERIALS HANDLING EQUIPMENT

Begins on page 144



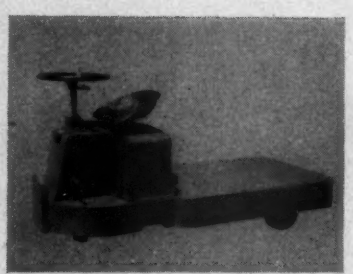
1-Ton Pick-Up Truck

Here's a 1-ton flat-bed truck for fast hauls. Speeds are 20, 12, and 6.4 mph. forward, and 6.4 mph. in reverse. Bed measures 4 ft. wide by 5½ ft. long, stands 20 in. high.

Standard automotive drive has Ross steering assembly, Borg-Warner transmission and clutch. The front wheels steer (as in an automobile) for making safe turns around sharp corners. Turning radius is 8 ft.

When used as a tow, this truck can exert a drawbar pull of from 4000 to 6000 lb.

Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles.



Freight Truck With Three Operating Positions

You can operate the Load-Mobile freight truck in any one of three positions. For normal operation the operator faces away from the load. Where there are narrow passage ways he sits facing the load. And on short hauls he can stand on a special side step for easy access on and off the truck.

This battery - operated truck comes in 3000- and 5000-lb. capacity models. Cushion rubber wheels have sealed ball bearings. Speed varies from 2½ to 4 mph., depending on load. Load-Mobile also doubles as a tractor when equipped with a suitable coupling.

Market Forge Co., 25 Garvey St., Everett, Mass.

More on next page

PANGBORN AC-4 "CORN COB" Blast Machine

Cleans Generators, Motors

Faster Better Cheaper

Eliminates Toxic Hazard of Solvents!

THE new portable Pangborn AC-4 Blast Machine scours armatures, parts, frames, coils, etc. in ⅓ the time of other methods. Material costs are reduced 90% and toxic or explosive solvents are eliminated.

Look at the savings shown by this recent test on electric motors. (Name of Company on request.)

Cleaning Duplicate 500 hp Synchronous Motors		
	Material	Labor
Solvent Method	$55.00	120 hrs.
PANGBORN Method	5.00	40 hrs.
SAVING	50.00 (90.9%)	80 hrs. (66.7%)

Remarks: With Solvent, drying period took an additional 8 hours.

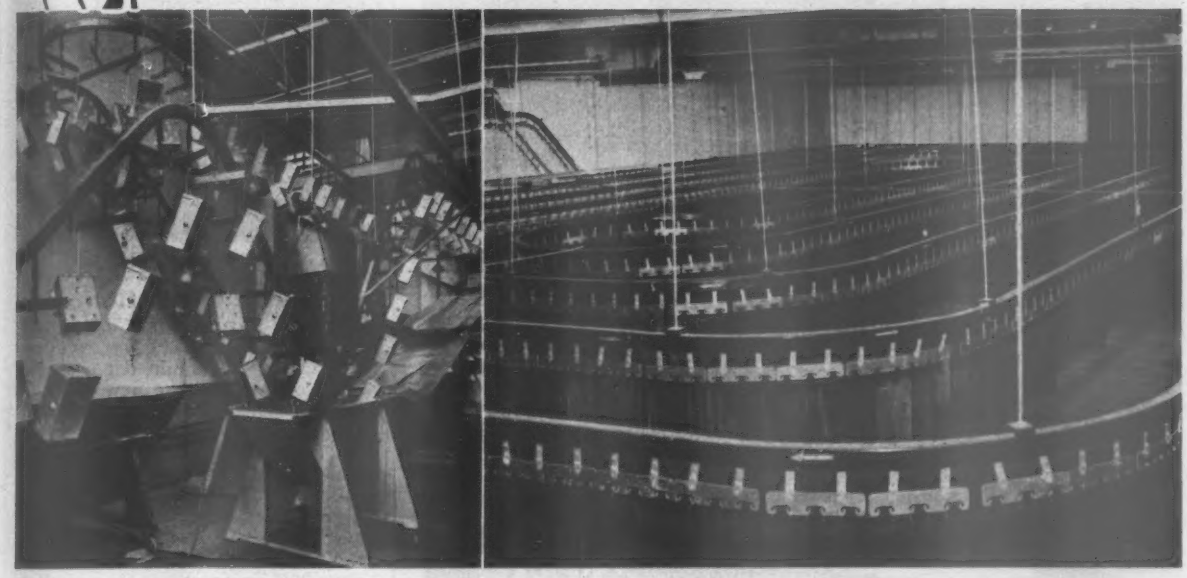
SIMPLE OPERATION
New Pangborn AC-4 Blast Machines use standard 40-pound air supply to remove oil and greases with blast of soft, 20-mesh corncob grits. No residue left on parts . . . no drying period.

FOR FULL INFORMATION, write today outlining your operation. Address: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the Latest Developments in Blast Cleaning and Dust Control Equipment

Pangborn
BLAST CLEANS CHEAPER with the right equipment for every job

How to keep your production line Really Rolling!



INCREASE EFFICIENCY...LOWER COSTS...WITH R-W "Zig-Zag"® Continuous Power Conveyors

Industrial plants in almost every category are today solving complex handling and production problems with ingenious "Zig-Zag" Conveyors made exclusively by Richards-Wilcox. Specifically designed to carry light loads through confined or crowded areas, to keep production and processing lines rolling more efficiently, "Zig-Zag" Conveyors are ideally suited to *any* size plant, and effect such substantial savings that the equipment usually *pays for itself in less than a year!*

* * *

Investigate now the advantages of installing this revolutionary materials-handling system in your *plant. For detailed information about R-W patented "Zig-Zag" Conveyors, write, phone or wire our nearest office today.*

ENGINEERED FOR ECONOMY AND FLEXIBILITY

- Horizontal and vertical units alternate in a continuous chain traveling through a special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves—two-foot radius.

1880 RICHARDS WILCOX R-W AURORA TRADE MARK Reg. U.S.Pat. Off. 1951

OVER 71 YEARS

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

AURORA, ILLINOIS, U.S.A. *Branches in all principal cities*

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT
INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS
ELEVATOR DOOR OPERATING EQUIPMENT

Here's how Pangborn

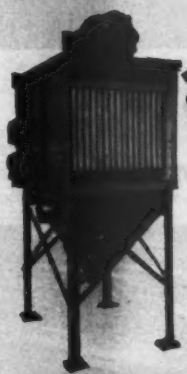
Solves these Problems

with this modern equipment

BLAST CLEANING!

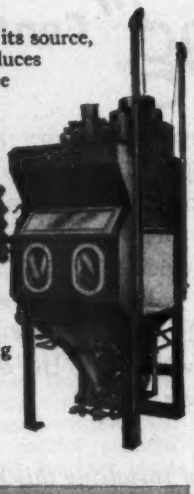
Blast Cleaning Cabinet quickly and easily cleans rust, grime, dirt, paint, etc., from metal parts. Produces a clean, smooth surface on pieces up to 60" x 36". Models available from $315.00 and up.

Blast Cleaning Machine not only removes rust, dirt, scale, etc., but is ideal for maintenance and many other uses. Cleans large objects such as bridges, structural work, tanks before painting. Six sizes, portable or stationary, from $170.00 and up.



DUST COLLECTING!

Unit Dust Collector stops dust at its source, minimizes machine wear and tear, reduces housekeeping and general maintenance costs. Solves many grinding and polishing nuisances. Reduces material losses. Models from $286.00 and up.



PRECISION FINISHING!

Hydro-Finish Cabinet uses liquid blast, eliminating dust, and reduces costly hand polishing, cleaning and finishing of molds, dies, tools, etc. Removes scale, discoloration and directional grinding lines, prepares surfaces for plating and coating. Holds tolerances to .0001". Models from $1295.00 and up.

LOOK TO PANGBORN FOR THE LATEST DEVELOPMENTS IN BLAST CLEANING AND DUST CONTROL EQUIPMENT

Pangborn

MAIL COUPON for full details

(Check for more information)

- ☐ Blast Cleaning Cabinets
- ☐ Blast Cleaning Machines
- ☐ Unit Dust Collectors
- ☐ Hydro-Finish Cabinets

PANGBORN CORP., 2100 Pangborn Blvd., Hagerstown, Md.

Gentlemen: Please send me more information on the equipment I've checked at the left.

Name.....

Company.....

Address.....

City.....Zone.....State.....

MATERIALS HANDLING EQUIPMENT

Begins on page 144

18-Volt Fork Truck for Ramp Operation

A new 18-volt motor drive unit gives Moto-Truc's heavy counterbalance fork lifts added power for ramp operation. The new drive is available in a 2000-lb. capacity model with 24-in. load center, and in a 2500-lb. unit with 18- or 24-in. load center. Lifting heights are 94 and 120 inches, with corresponding collapsed mast heigths of 72 and 83 inches.

Moto-Truc claims the new trucks have 30% more power than similar 12-volt models. They'll load up 12% ramps for 8 continuous hours. Travel speed is 3 mph. loaded, 3½ mph. without load. They'll lift a 2000-lb. load at a rate of 20 fpm.

The Moto-Truc Co., 1953 E. 59th St., Cleveland 3.

New Drive, Transmission Improve Tractor Loader

A hydraulic torque converter drive and a newly designed clutch-type transmission have been added to the Tracto-Loader.

The single-stage torque converter furnishes a smooth flow of power to the rubber-tired drive wheels. Crowding action is improved, wear

and tear on clutches and other parts minimized. Maker says there is practically no wheel spin, even when loading in high gear.

The new transmission eliminates most gear shifting. There is one lever control for forward and reverse. You have a selection of 4 forward and 4 reversed speed ranges.

The Model TL-10 loader is powered by a 40½-bhp. gasoline engine. The ¾-cu. yd. capacity bucket is hydraulically controlled, has ample clearance to load average-size dump trucks.

Tractomotive Corp., Deerfield, Ill.

Sitdown Fork Truck With 10,000-lb. Capacity

Automatic Transportation claims to have the first 10,000-lb. sitdown-type electric fork truck with automotive controls. The LFS-100 tiers to 110 inches from a collapsed height of 83. Width at broadest point is 48 inches. This big boy will right-angle stack in aisles measuring 106 inches plus load length, and turn in intersecting aisles 80 inches wide.

This and three other new units—7000-, 8000-, and 9000-capacity sitdown trucks—round out the Skylift line, which starts at 3000-lb.

Automatic Transportation Corp., 149 W. 87th St., Chicago.

•

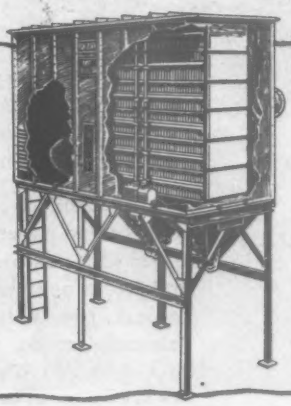
ELECTRIC FORK TRUCK has single-cylinder, low-pressure, double-action hydraulic hoist. Simplified hoisting mechanism is said to have fewer moving parts, be easier to service, and provide increased visibility. The 6000-lb. capacity unit tiers to 126 in. The Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3.

More on next page

*At the Kellogg Company of Battle Creek, Mich., this Pangborn Dust Control system salvages 35 tons of valuable dust per day. Collected from the corn mill and the Gro-Pup building, the dust is valued at $40 a ton . . . building a profit of *$1400 a day* for Kellogg!

Here's how Pangborn makes Dust Control *profitable* for industry!

Pangborn Dust Collectors make low-cost dust control possible. As this cutaway shows, type "CH" Collectors are compact, offer maximum filtering area in a given size. Filter life is prolonged because dust-laden air passes through collector at low velocity. Efficiency is extremely high; in fact, clean exhausted air can often be returned direct to plant.



FIND OUT how Pangborn Dust Control *turns dust into profits.* Write for a copy of Bulletin 909A to: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the latest developments in Dust Control and Blast Cleaning Equipment

STOP THE DUST HOG from stealing profits with

Pangborn

DUST CONTROL

9 hour packaging job CUT to 1½

This Angier Paper STOPS RUST without Grease, Gunk or Goo

Think of your savings!

Here's an exporter who has *scrapped slushing* and all the mess that goes with it! When grease and oil were smeared over these intricate machines, packaging time was over 9 man-hours. Now only 1½ hours does it!

The answer is... Angier VPI* Wrap. This chemically coated paper gives off a vapor that *prevents rust!* If you ship or store metal products or parts, this clean and *proven* new way to stop rust is a cinch! Your customers, too, will be all for it because there's no "cleaning" to do. Get the facts now in "Applications of Angier VPI Wrap." It's FREE!

*T. M. Reg. U. S. Pat. Off. (Vapor Rust Preventive)

Angier CORPORATION Framingham 1, Mass.

Send "Applications of Angier VPI Wrap" as applied to rust control of:

..... Name

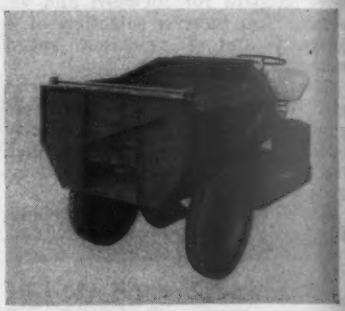
..... Title

..... Address

( ) Machinery - Industrial, Metal Working, Farm, Office, Construction.
( ) Electrical Machinery, Appliances, Products.
( ) Fabricated Products—Cutlery, Hardware, etc.
( ) Transportation Equipment—Aircraft, Auto, Naval, Railroad, etc.
( ) Steel in process of fabrication.
( ) Instruments and clocks.
( ) Ordnance Equipment.
( ) Others:

MATERIALS HANDLING EQUIPMENT

Begins on page 144

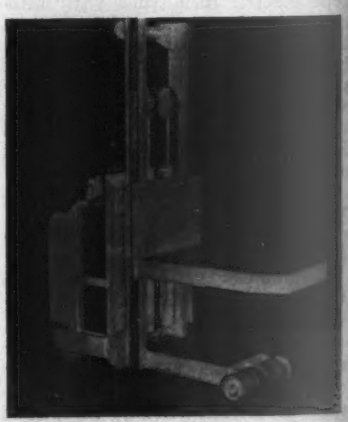


Dump Truck With Discharge Control

Kalamazoo has added a dump control door to the front end gate of its Kal-Truk. This manual control permits partial discharge and dumping into small or narrow openings. You can still have rapid discharge by releasing the entire end gate.

Built like a tractor, Kal-Truk accommodates two different types of materials handling bodies. When equipped with its 2/3-cu. yd. capacity dump body, it can be loaded directly from hoppers or mixers to move materials to the spot needed. An interchangeable steel platform body is designed for handling packages and large bulky loads. Both body types tilt forward for easy discharge.

Kalamazoo Mfg. Co., 1829 E. Reid St., Kalamazoo, Mich.



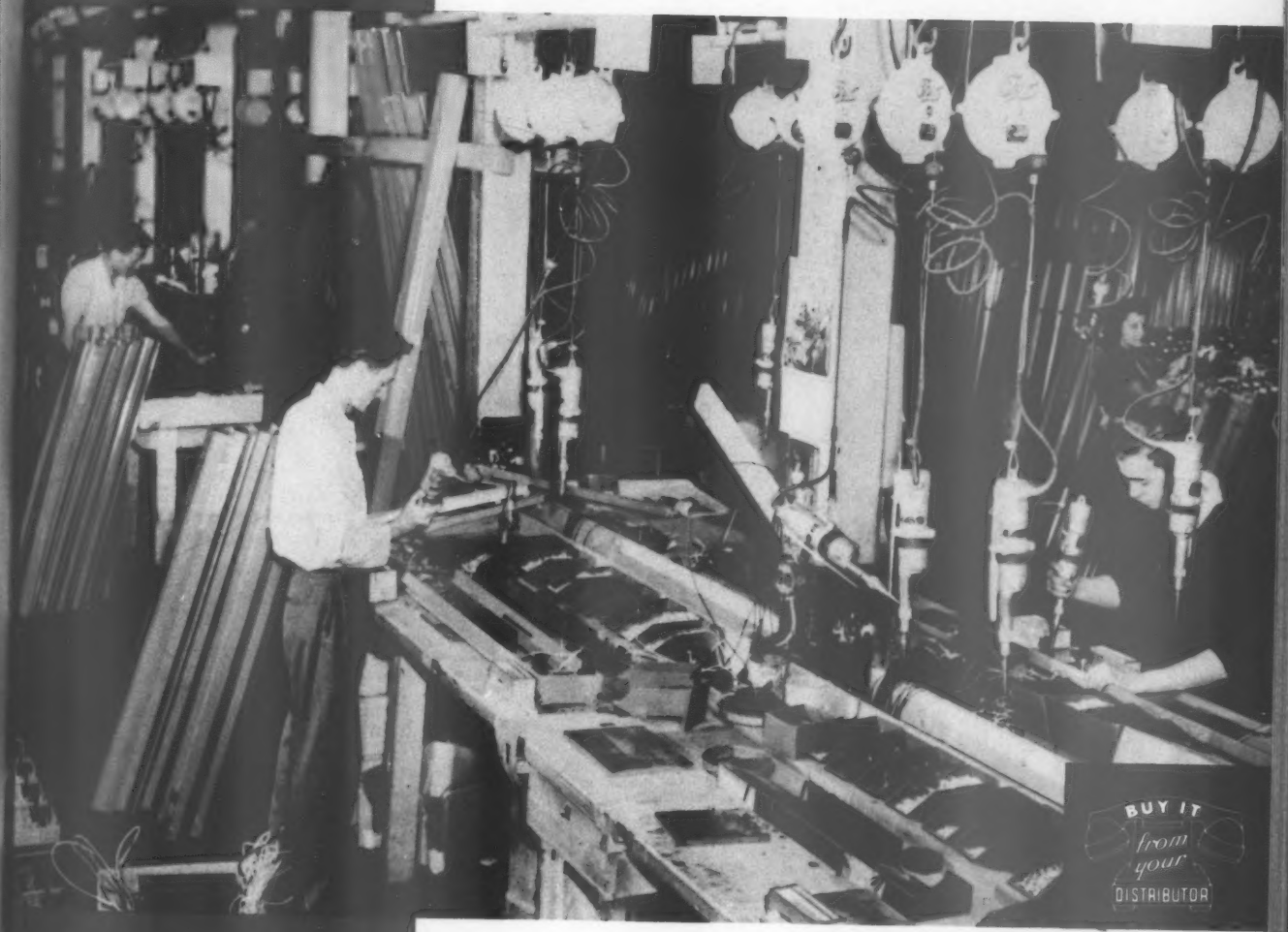
Heavy-Duty Platform Lift for Narrow Aisles

This 4000-lb. platform lift is said to retain the maneuverability of lighter models in the Spacemaker line. You can use it for tiering skids in narrow aisles and

Portable Electric

- Screw Drivers
- Nut Setters
- Drills
- Impact Wrenches
- Tappers

Thor PORTABLE POWER TOOLS



Portable Electric

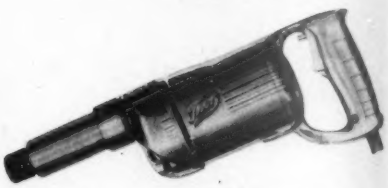
- Bench Grinders
- Saws
- Hammers
- Sanders
- Polishers

for MANUFACTURING and MAINTENANCE

No. 8 DRIVERS
Capacity:
No. 8 Screw, 3/16" Nut
18 Models

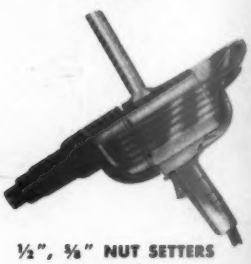
No. 12 DRIVERS
Capacity:
To No. 12 Screw, ¼" Nut
13 Models

No. 14 DRIVERS
Capacity:
No. 14 Screw, 5/16" Nut
18 Models



No. 18 DRIVERS
Capacity:
No. 18 Screw, ⅜" Nut
5 Models

Reduce assembly costs, speed output—with Thor UNIVERSAL ELECTRIC screwdrivers and nut setters. Equipped with positive, slip, or kick-out clutches for precision control of tension. 58 models for every fastening requirement.



½", ⅝" NUT SETTERS
Capacity:
No. 24 Screw, ⅜" Lag Screw
4 Models

PORTABLE ELECTRIC

Thor SCREWDRIVERS and NUT SETTERS

Silver Line TOOLS

NEW POWER, new precision, new sturdy dependability in a completely new line of portable electric tools developed from Thor's 58 years experience in power tool design and manufacturing.

BALANCERS FOR TOOL SUSPENSION

Suspend screwdriver and other tools over the work. A slight pull brings the tool down . . . upon release it rises out of the way.

SIZE	O	OX	10B	10BX	20B	30B
Capacity, lbs. Maximum	8	10	10	20	20	30
Minimum	0	3	5	10	10	20
Range of Travel in Feet	5	5	5	5	6	6
Distance Hook to Hook Standard*	19"	19"	35"	35"	54"	54"
Minimum**	13"	13"	16"	16"	17½"	17½"
Weight, lbs.	13½"	13½"	16¾"	16¾"	44"	44"

*As shipped with standard length cable.
**Obtainable by shortening cable.

Silver Line PORTABLE ELECTRIC DRILLS

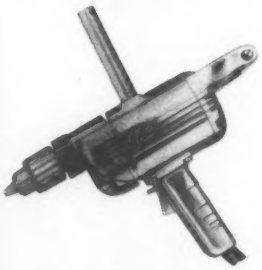
¼" STANDARD DUTY
7 speeds—550 to 5000 R.P.M.
plus Right Angle Model
Weight, 3 lbs.

¼" HEAVY DUTY
7 speeds—500 to 5000 R.P.M.
Pistol Grip or Side Handle
Weight 3⅞ lbs.

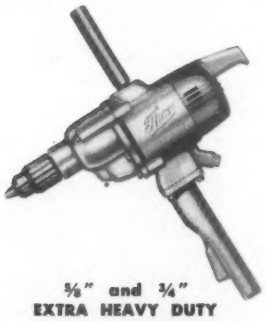
¼" HEAVY DUTY
DURABLE PLASTIC HOUSINGS
2500, 3750 or 5000 R.P.M.
Pistol Grip or Side Handle
Weight 3¼ lbs.

¼", 5/16", ⅜"
HEAVY DUTY
GRIP HANDLE DRILLS
8 Models—Av. Wt. 7 lbs.
Right speeds for each capacity

¼" STANDARD DUTY
"COPPER LINE" CLASS
2000 R.P.M. Wt., 4 lbs.



½" HEAVY DUTY (8 LBS.)
½" EXTRA HEAVY DUTY (13½ LBS.)
⅝" and ¾" STANDARD DUTY (14 LBS.)

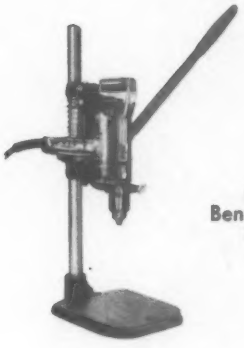


⅝" and ¾"
EXTRA HEAVY DUTY
⅞", 1" and 1¼" HEAVY DUTY
Spade Handle or Feed Screw

½" STANDARD DUTY
"COPPER LINE" CLASS
420 R.P.M. Wt., 10 lbs.

Silver Line IMPACT WRENCHES

Fastest, easiest way to remove or apply nuts, drive screws, drill in masonry, steel, etc. Runs as free as an electric drill on lighter applications, delivers two hard rotary impact blows for every spindle revolution when the going is tough. Extra sturdy Thor impact mechanism delivers wider-radius blow for extra power and efficiency.



DRILL STANDS
Bench or Post Type
For All Drills

⅜" ELECTRIC
IMPACT WRENCH
6 lbs., 14 oz.

½" ELECTRIC
IMPACT WRENCH
12¼ lbs.

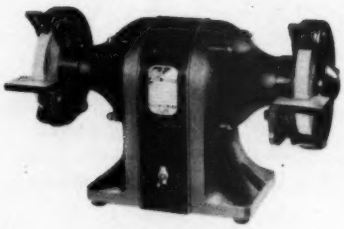
COMPLETE CARRYING-CASE KITS AVAILABLE

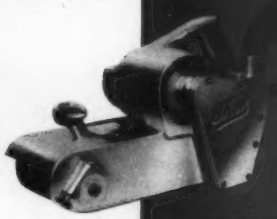
Since 1893

Thor PORTABLE POWER TOOLS

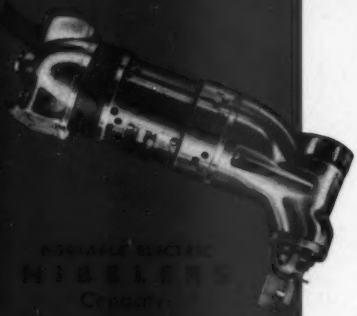
for MANUFACTURING and MAINTENANCE

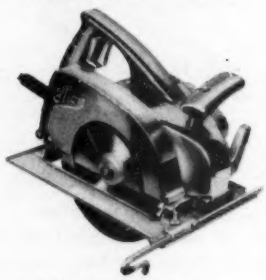
BUY IT from your DISTRIBUTOR

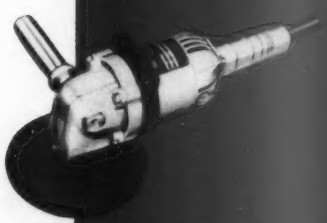




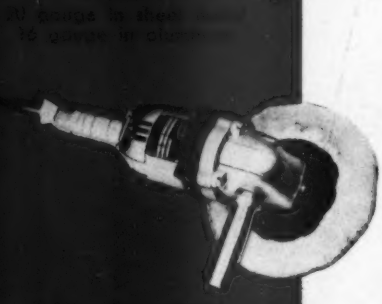
BALL BEARING
BENCH GRINDERS
6", 7", 8", 10" Wheels

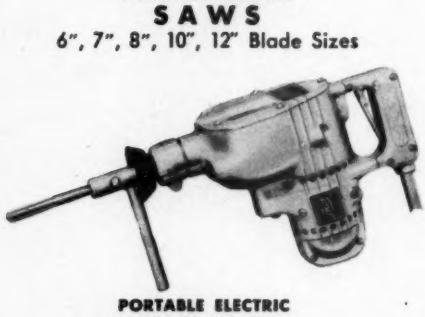






PORTABLE ELECTRIC
SAWS
6", 7", 8", 10", 12" Blade Sizes





PORTABLE ELECTRIC
HAMMER
1⅛" Star Drill Capacity
Weight, 14 lbs.

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See "TOOLS-ELECTRIC" in Your Local Telephone Directory

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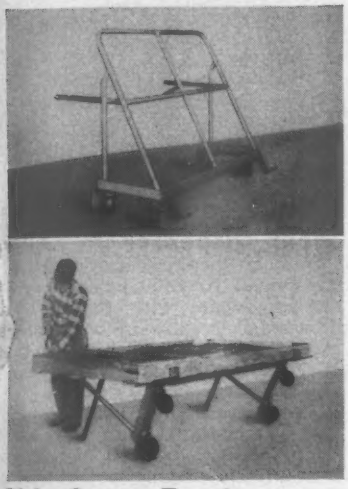
crowded working areas. It will right-angle stack from aisles only 24 inches wider than the load length.

Standard 24-in.-wide platforms range in length from 30 to 48 inches. You can have lowered height of either 7 or 11 inches. Lift rises 58 inches on a standard 83-in. mast.

Lyon-Raymond Corp., 32-79 Madison St., Greene, N .Y.



Side-Carry Truck Doubles as Table

The Rol-Away Model AWL isn't like most hand trucks for carrying flat cases and sheetmetal. It doubles as a table, too.

By tipping the truck back, you get a sturdy platform for packing or unpacking loads. It's a timesaver and makes crating and hauling a one-man operation.

Rol-Away Truck Co., 2340 Columbia Blvd., Portland 17.

•

HAND PLATFORM TRUCKS announced by Clark Equipment Co., Battle Creek, Mich., are of same design as previously announced Hydro-Lift and Electro-Lift pallet trucks (FACTORY, Nov. '50, p. 166). Gasoline-engine and battery-powered models have platform and trail wheel assembly instead of pallet frame. Available with 24- or 26-in.-wide platform, with lengths ranging from 30 to 72 in. Platform lift is 4 in.

PORTABLE STACKING ELEVATOR with a 7-ft. lift has been added to the line of Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9. Caster-mounted unit is of the crank up-down type. Capacity is 500 lb.

More on next page

Well Stacked!

Prefabricated pallet racks by Equipment Mfg. Inc. permit stacking to conserve floor space without tying up low level material. They are engineered for strength, safety and flexibility. There's a type to suit your particular needs.

Write for our catalog. It illustrates all types.

EQUIPMENT MFG. INC.

21561 Hoover Road Detroit 5, Michigan

MATERIALS HANDLING EQUIPMENT

Begins on page 144

Motorized Steel Strap Dispenser

You can speed up strapping with steel band in your warehouse or shipping room with this electric dispenser. It uncoils strap along the floor to desired length so that operator can cut it off with hand shears.

The Gerrard Coil Dispenser handles ¾- and 1¼-in. heavy-duty steel strap. Maker says you can locate it in any convenient spot, reload it with ease. Standard drive has 110-volt a.c. motor.

A. J. Gerrard Co., 1962 Hawthorne Pl., Melrose Park, Ill.

Hand Truck for Moving New Shipping Container

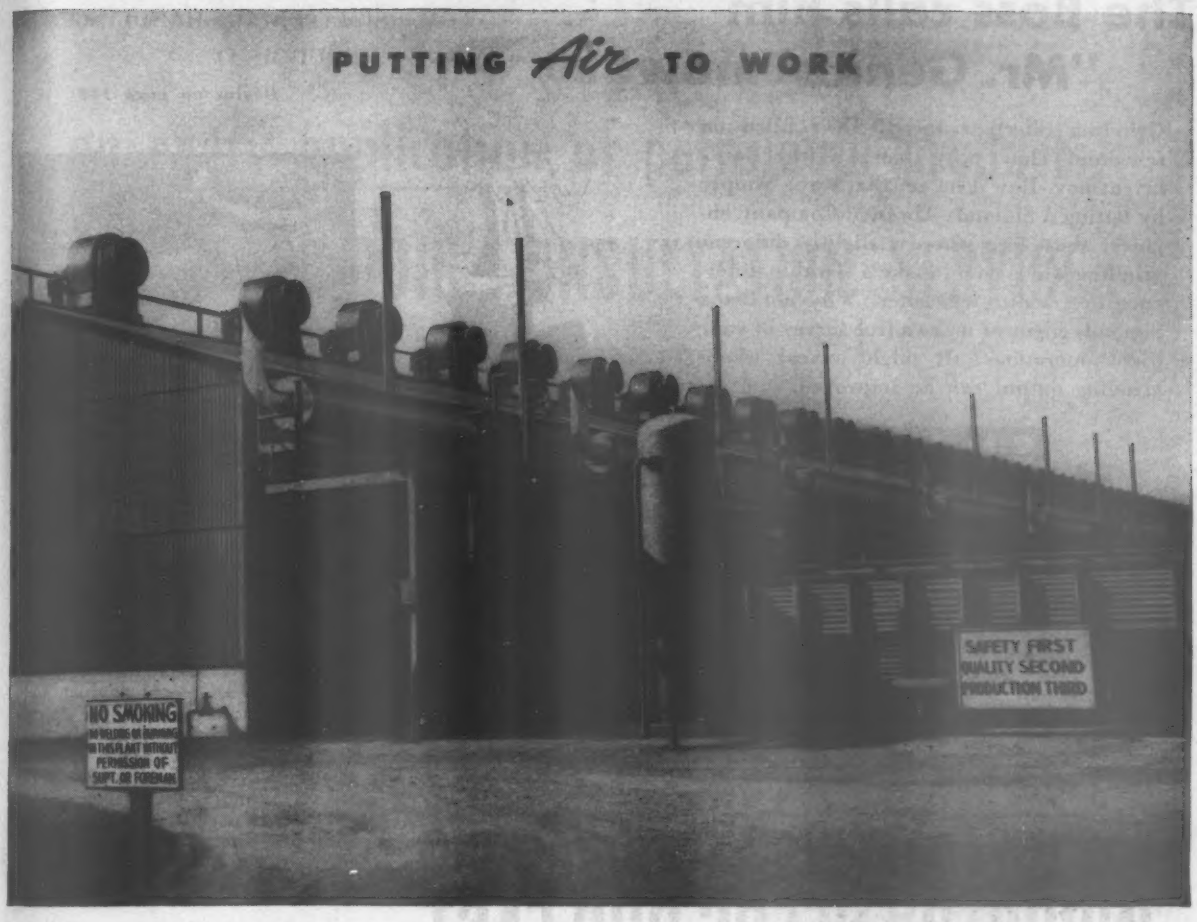
When new shipping containers are developed, you can bet that the materials handling people will come up with a new piece of equipment for handling it. The Thomas 2-wheel hand truck is just such a case. Its specialty is the new-style cardboard "keg" used in shipping bolts, washers, and small metal parts. These containers measure 12x12x18 inches, weigh as much as 300 lb. when filled.

With a Thomas truck, one man can pick up one of these containers, roll it away, or deposit it on a pallet or skid, without ever touching the box with his hands. The truck has a short nose blade that can be easily inserted under the case, and a hinged hook arm that clamps down over the box top to hold it securely on the truck.

Truck frame is made of ¾-in. pipe. Wheels are rubber tired with roller bearings.

Thomas Truck and Caster Co., 3331 Mississippi River, Keokuk, Iowa.

More on next page



28 LUNGS THAT EXHALE AN EXPLOSIVE HAZARD

Every 60 seconds there must be a complete change of air in this building. Reason: to prevent the accumulation of explosive hydrogen, used in manufacturing ammonia. But what could be a dangerous process is made safe in one of the newest synthetic ammonia plants recently built in the Southwest by exhausting air through Sturtevant Elbow Axial Flow fans . . . 28 strong, right down the rooftop.

Strong north winds can't "back pedal" those fans . . . and rain is completely shut out. Motors, bearings and belts are located outside the air stream, an industry-proven advantage in exhausting corrosive fumes.

To meet the need for efficient fume or vapor removal in your plant—as well as air conditioning, air handling or air cleaning—there is Sturtevant equipment specifically designed to help you put air to work. Contact your local Sturtevant office, or write to Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

YOU CAN BE SURE...IF IT'S **Westinghouse**

PUTTING Air TO WORK

J-80209

The Boss calls him "Mr. Genius" now!

Grinding rejects reduced! DO's filled on schedule! That's why George is the Boss's bright boy. How'd he get that way? Simply by letting a Simonds Abrasive Company engineer show him where a slightly different grinding wheel could make a sizeable difference in grinding efficiency. Why not let a Simonds engineer make a free survey of your plant operations? It might reveal where grinding output can be improved.

SIMONDS ABRASIVE CO.

Grinding Wheels

EXECUTIVES — *Simonds Abrasive Company's complete line has everything you need . . . grinding wheels, mounted points and wheels, segments and abrasive grain.*

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
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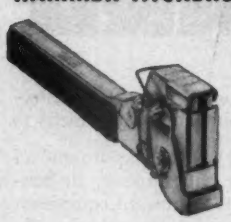
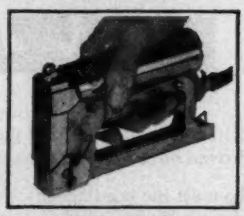
FOR LOW COST HIGH SPEED TACKING
INDUSTRY NEEDS DUO-FAST

HAMMER TACKERS



Tack with speed on production, maintenance, and in the shipping room with Duo-Fast Hammer Tackers.

Every plant has a tacking or fastening job that can be done better and faster with Duo-Fast Hammer Tackers.



AIR TACKERS

Tack with air for trigger fast tacking. Air does the work.

Duo-Fast Air Tackers provide top speed, accurate tacking—saves time, energy, money and steps up production.

GUN TACKERS

Safe, accurate tacking is provided by the Staple Gun.

Protects your material, tacks in awkward, difficult places.

Does any hammer and tack job and does it faster, neater and safer.

PROTECT YOURSELF WITH DUO-FAST FREE SERVICE POLICY

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MATERIALS HANDLING EQUIPMENT

Begins on page 144

Rotary Airlock Feeder

Prater Pulverizer claims its new airlock feeder provides a positive, accurate method of feeding powders and granular products into air conveying lines. You can also use it for sealing off air-leakage at the discharge of dust collectors, or for feeding material at a predetermined rate into mixers, blenders, and hoppers.

The feeding rotor has renewable rubber wiper strips that insure a tight but flexible seal against leakage. An additional oil seal on the outside of bearings prevents leakage into the feeder, keeps dust out of the bearings. Two models come with 1/3- and ½-hp. drives.

Prater Pulverizer Co., 1515 S. 55th St., Chicago 50.

Automatic Dump Hopper

The Brusco hopper has a dump release that can be tripped by the fork lift operator. When the trip is released, the unbalanced weight of the load dumps the hopper forward. The empty hopper then automatically rocks back to the loading position.

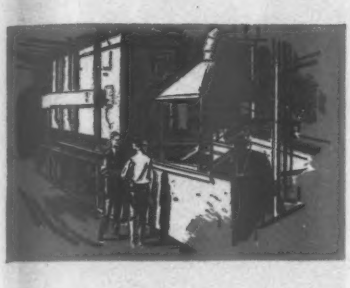
This automatic hopper was designed to speed scrap handling and disposal, but is useful in other handling jobs. You can use your fork or pallet lift trucks to handle this combination hopper-and-skid. Capacities range from ½ to 2 cubic yards.

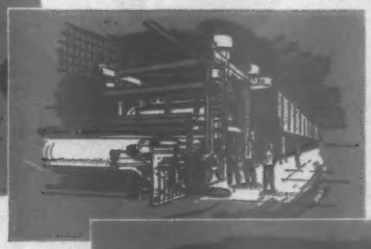
Brummeler Steel Products Co., 1415 Ionia Ave., S. W., Grand Rapids, Mich.

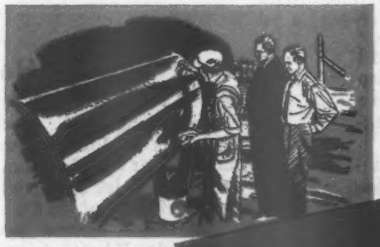
More on next page

Now! one-source help on every application of petroleum products:

GULF PERIODIC CONSULTATION SERVICE







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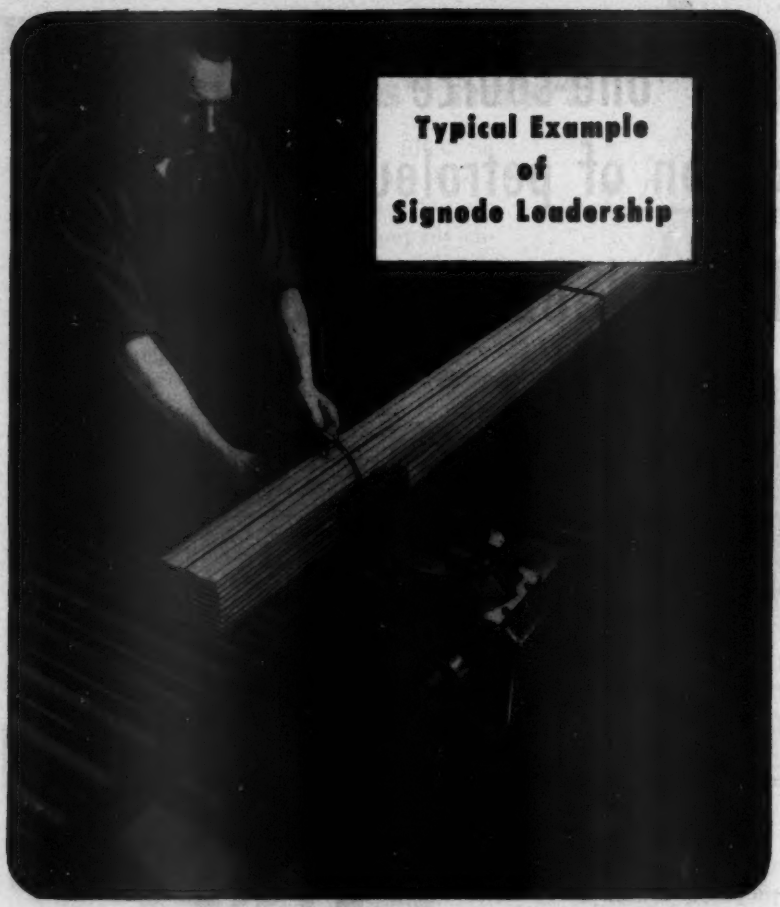


AUTOMATIC POWER STRAPPING!

If you have never seen a Signode Power Strapping Machine in action, this may seem hard to believe!

This mechanical device . . . with but the slightest guidance . . . draws steel strapping from a reel, loops it completely around a package or bundle, brings it to just the right tension, and then seals and severs the strap . . . at speeds up to 500 completed operations per hour . . . on such widely varying products as cartons of cigarettes and coils of wire.

Developed to meet the needs of mass production shippers, the Signode Power Strapping Machine, in one or another of its variations, has opened up a whole new avenue of profit possibilities for manufacturers of millwork, flooring, steel, canned food, plastic sheeting, automotive parts and scores of other products. It is one of the more recent, in a long list of contributions, which Signode has made to better packaging and shipping.

If you are engaged in defense or essential civilian production, we'd like to tell you more about Signode steel strapping, strapping tools and methods. Write . . .

SIGNODE STEEL STRAPPING COMPANY
2663 NORTH WESTERN AVENUE CHICAGO 47, ILLINOIS
this seal means security in shipping

Offices Coast to Coast
In Canada: Canadian Steel Strapping Co., Ltd.
Foreign Subsidiaries and Distributors World Wide

MATERIALS HANDLING EQUIPMENT

Begins on page 144

Tong-Type Grab Locks in Open Position

Unlike ordinary tong-type grabs that collapse after the load is discharged, the Beacon Claw remains open until placed over the next load.

This automatic locking feature decreases handling time, minimizes operator fatigue. Other features include (1) scissor-action grip that increases holding power as the load increases, and (2) parallel gripping surfaces that protect cartons and boxes in handling.

Cleveland Beacon Products Co., 1480 Lakeside Ave., Cleveland.

Electric Chain Hoist With V-Belt Drive

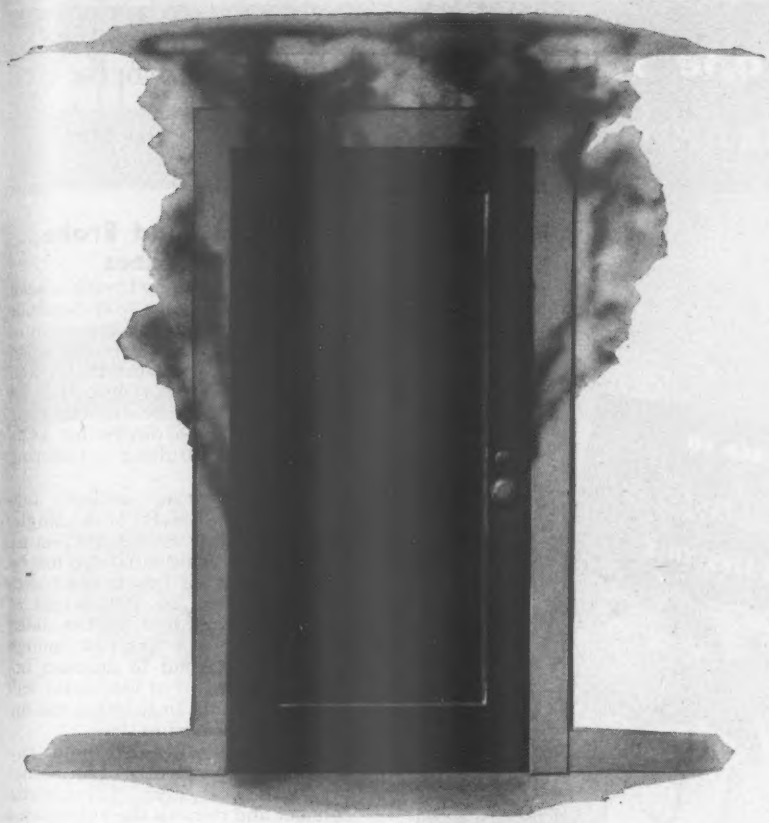
The Rocket 51 electric chain hoist has a V-belt-driven cam-actuated gear mechanism. It has a 10½ to 1 hoist ratio, with a hoisting efficiency of 95.6%.

The David Round people claim that their V-belt drive design is a completely new development in chain hoist construction. Power is said to be transmitted to the drive wheel with less friction loss than in conventional gear assembly.

Models are available in 500- and 1000-lb. capacities powered by 220/440 volt, 3-phase motors. The Rocket weighs 79 lb., has a 14-in. headroom. You can get lifting speeds of 17, 21, 24, and 34 fpm. Manual rope controls.

David Round & Son, Broadway & Henry St., Cleveland 5.

More on next page



Where is the safest place to keep your documents?

Are your contracts, blueprints, accounts receivable—the records that keep your business going—really safe?

If you've ever seen business papers charred by fire . . . or made illegible by water from fire fighting, you'll want to make sure it can't happen to your records.

Wherever you store these papers, you can rely on a *Kidde* Fire Extinguishing System to protect them. A Kidde System uses carbon dioxide—a gas that won't mark, stain or discolor papers—and it puts out fire *fast*.

You can put a Kidde system on guard over one or many record vaults . . . ready at the first sign of flame to release a fire-smothering cloud of CO_2 . . . and do it *automatically*.

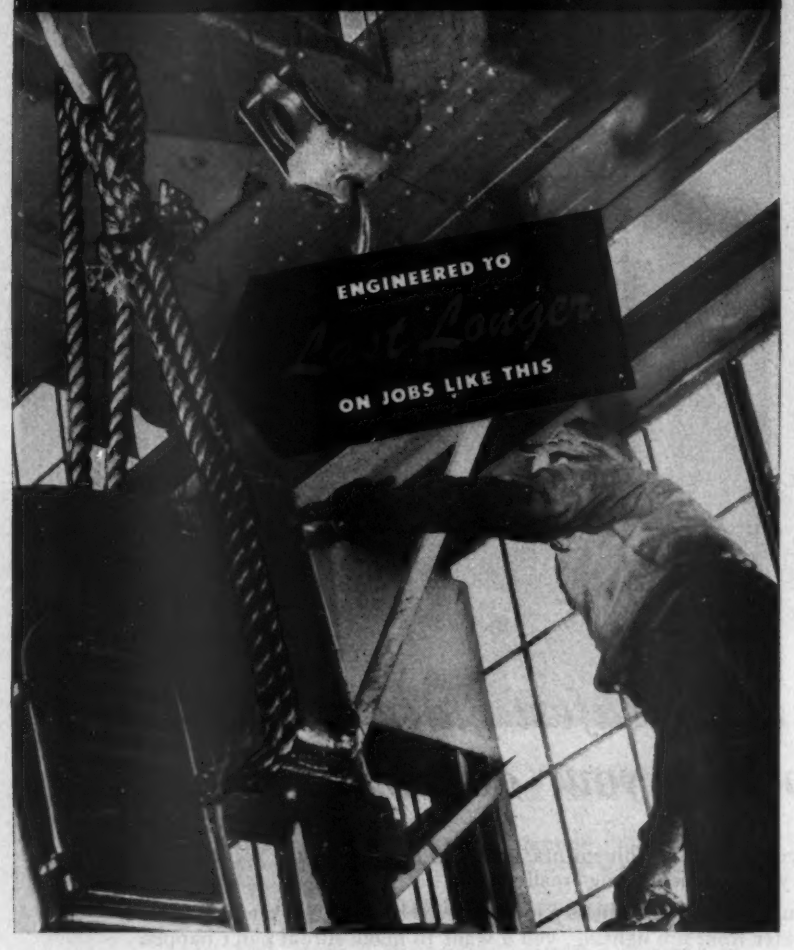
Why not go *all the way* in protecting your papers. Call a Kidde expert for full information.

Kidde

Walter Kidde & Company, Inc., 532 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

For Greatest Rope Safety

PLYMOUTH SHIP BRAND MANILA



THE TENSILE STRENGTH of Plymouth SHIP BRAND MANILA rope averages 25% higher than published "minimums" . . . provides a proportionately higher safety factor . . . extra protection against accidental overloads. The fiber quality and construction that help make this higher strength also mean longer service life, lower service costs, under normal operating conditions with the accepted 5 to 1 factor. Play safe and specify Plymouth SHIP BRAND—best rope buy for *any* industrial job.

PLYMOUTH
Cordage Products

PLYMOUTH CORDAGE COMPANY
378 Court Street, Plymouth, Massachusetts
Send informative booklets and charts to help get more life from my ropes.
Name_____
Company_____
Address_____

ROPE AND TYING TWINE FOR INDUSTRY

MATERIALS HANDLING EQUIPMENT

Begins on page 144

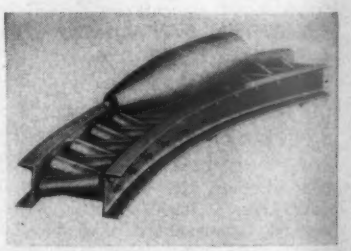
Automatic Load Brake for Hoists, Cranes

There's likely to be trouble ahead when a crane or hoist load descends without the continuous attention of an operator. The suspended load may overhaul the hoist motor and drop at a dangerous speed. But not if you're using a Downs mechanical load brake—a device for automatically controlling lowering speed.

The Downs brake is built into the low-speed shaft of a single, double, or triple gear reduction assembly. Lowering is controlled by two pawls forced into contact with a ratchet wheel by the weight of the load. Operation of the hoist motor opens the brake just enough to permit the load to descend under direct control of the motor and at motor speed. In hoisting the entire mechanism runs free.

The brake will also hold any position independently of any other brakes in the system. You can disconnect and remove the hoist motor under full load without danger. For close spotting of loads, though, you'll need an auxiliary electric holding brake—the Downs brake cannot close for a dead stop while the motor shaft is turning.

Downs Crane & Hoist Co., 540 W. Vernon Ave., Los Angeles 37.



Gravity Conveyor for Cylinders

Though designed primarily for artillery shells, this roller conveyor can be used for the safe, speedy handling of any cylindrical object.

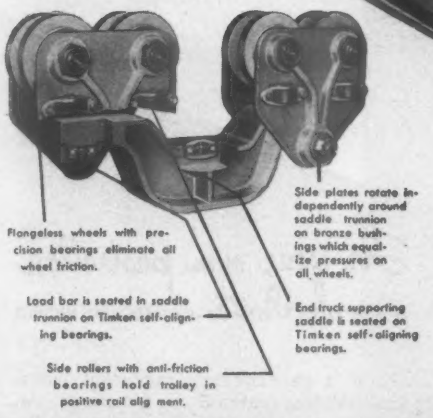
The rollers are set at an angle to cradle the cylinders in the center of the conveyor. You can snap out the rollers, reverse them when they become worn in one spot. Available in 10-ft. straight-sections, and 90-deg. curves—wood or steel construction.

Lamson Corp. 303 Lamson St., Syracuse, N. Y.

More on next page

AMERICAN MONORAIL CRANES

for **constant service**


Flangeless wheels with precision bearings eliminate all wheel friction.
Load bar is seated in saddle trunnion on Timken self-aligning bearings.
Side rollers with anti-friction bearings hold trolley in positive rail alignment.
Side plates rotate independently around saddle trunnion on bronze bushings which equalize pressures on all wheels.
End truck supporting saddle is seated on Timken self-aligning bearings.

Only two men are needed to transfer bundles from shipping rooms directly into gondola cars — a saving of 32 man-hours per shift over previous method. This crane is in constant service. The secret of its success is Articulated Trolleys.

When each trolley wheel carries its share of the load in perfect alignment with the craneway tracks and all possible friction is eliminated, the result is perfectly articulated trolley travel.

Applied to American MonoRail Cranes, these articulated trolleys permit constant operation—handling loads up to 10 tons. And with this is offered all the flexibility of MonoRail design for interlocking carrier service between and beyond the craneways.

Let an American MonoRail engineer explain all the advantages of these new cranes, or write for complete information.

THE AMERICAN MONORAIL COMPANY

13114 ATHENS AVENUE **CLEVELAND 7, OHIO**

Plant managers need to know more about wood!

For your own protection
BUILD WITH *Penta*-PROTECTED WOOD

Wood is an extremely important industrial building material . . . for many jobs the best you can use. It's easy to handle, has superior sound-absorbing qualities, and is comparatively cheap. Now you can get still more from your wood dollar by using it with PENTA, the clear wood preservative. PENTA adds years of life and strength to wood by protecting it against termites, rot, fungi, decay, preventing actual destruction of wood that lasts up to three times longer than untreated wood. Proof of this is that PENTA leaves wood clean and easy to work with.

Build with wood . . . build with safety and satisfy with economy by using PENTA.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Send for free booklet
"Pointers on Penta"

The Dow Chemical Company
Dept. PE-14A
Midland, Michigan

Name_____

Title_____

Company_____

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City_____ State_____

DOW
Penta
chlorophenol

WHAT'S NEW IN EQUIPMENT

Begins on page 144

AIR CONDITIONING

Weather-Tight Roof Ventilator

You can have positive controlled plant ventilation independent of wind or weather with the new Type PRV power roof ventilator. Backward curved centrifugal fan, motor, and air controls are all enclosed in one weather-tight housing. There's no need for a high-profile curbing or external fitting of control accessories.

The unit comes in 11 sizes with up to four speeds in each size. Welded steel frame has hinged roof and removable discharge louvers for ease of maintenance. Motor is self-cooled. Maker claims extra-quiet operation for his low speed ventilators.

The Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago.

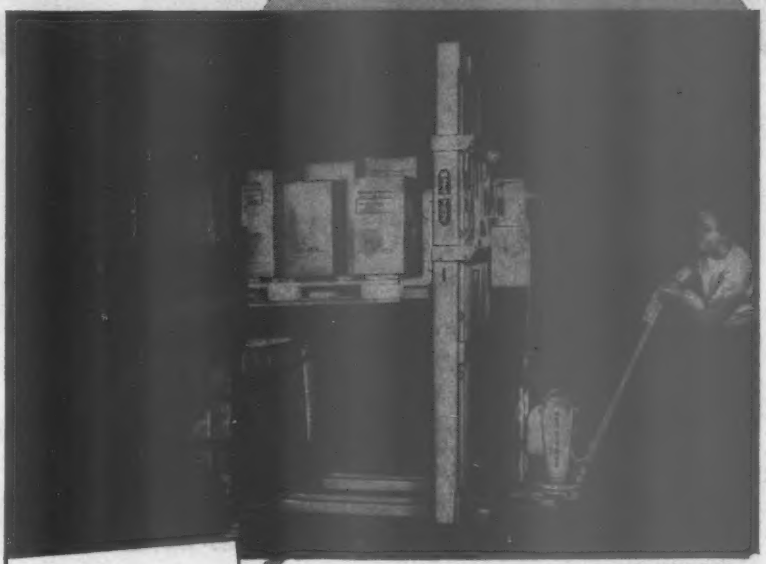
Impingement-Type Filter With Built-In Strainer

The Glassfloss permanent-type filter cleans heating and ventilating air two ways. Like most standard air filters, it has an adhesive pad to catch impinging dust and dirt. The new wrinkle is a bonded straining mat fitted into the downstream side of the filter frame. The company claims that this combination of impingement-strainer filtering traps up to 98% of the dust and dirt in the air.

Glassfloss, 155 E. 44th St., New York.

More on next page

There's a Rapid Trend to Palletizing with MOTO-TRUCS



One of the MOTO-TELESCOPIC HI-LIFT TRUCKS at Thompson Products Co. Cleveland

● Since turning to palletizing with Moto-Trucks, Thompson Products Company has been able to use about 25,000 fewer square feet of floor area to do the same job of warehousing, and save labor.

● A few of many reasons why leading materials handling engineers choose MOTO-TRUCKS:

Moto-Truc Telescopic Hi-Lift Trucks are from 18" to 20" shorter than other trucks of this type, due to more compact power unit, enabling operation in narrower aisles.

Controls, in easy grip roller type handle, reduce operator fatigue.

Patented articulating hinged spring unit holds drive wheel down on floor.

Four point mounting under load insures stability.

Power by 12-volt motors for level operation and higher voltage for ramp operation.

Brake, mounted on drive wheel and controlled directly from steering handle, gives dependable protection for both operator and load.

WRITE FOR BULLETIN NO. 51 AND SPECIFICATIONS

HI-LIFT TRUCKS, PLATFORM TRUCKS, PALLET TRUCKS

The MOTO-TRUC Co.
1953 E. 59th Street
CLEVELAND 3, OHIO.
Originators and world's largest exclusive manufacturers of motorized, battery operated walkie type trucks

McCaskey multiple-copy forms visualized on these wall boards give Mason-Neilan Regulator Company simplified control of . . .

MACHINE LOADING, DISPATCHING PRODUCTION PROGRESS AND COSTS

Mason-Neilan's controls include: the machine load for all machines at all times; the delivery of material to machines; the progress of each production order and the number of pieces produced daily compared with standards and schedule; the daily cost status of a thousand jobs in process; detailed costs almost immediately after their completion.

Three-copy time tickets made at "one-writing" provide identical data from the shop to three control divisions where they are immediately visualized on McCaskey Planning Boards for quick reference by planning and cost departments.

McCaskey Controls have served Mason-Neilan thru fourteen years of varying conditions. They are providing up-to-the-minute information today with a minimum of clerical personnel and paper work.

Write for a demonstration and suggestions for your particular needs. Send for descriptive literature.

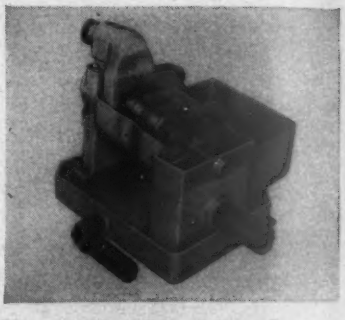
THE McCASKEY REGISTER CO.
ALLIANCE, OHIO
Send me literature on Machine Loading, Production and Cost Controls.
Name .....
Position .....
Company .....
Address .....
FM 551

McCaskey
INDUSTRIAL CONTROLS
PRODUCTION • INVENTORY • TOOLS • COSTS • PAYROLL

WHAT'S NEW IN EQUIPMENT

Begins on page 144

AUXILIARY EQUIPMENT



Magnetic Clarifier for Machine Tool Coolants

The Houdaille magnetic clarifier will extend the life of your machine tool coolants, provide longer tool wear, and better surface finishes. It removes over 98% of contaminants from oil coolants used in grinding and cutting operations.

Magnetic contaminants are picked off by permanent ring magnets encased in a revolving drum. Non-magnetic abrasives are collected in a wiper trough fitted to the rotating cylinder.

You use one clarifier for each machine tool. Rated capacity is 20 gpm. When operated above rated capacity, excess coolant is returned to machine tool sump. A 1/12-hp. 110-volt single phase motor operates the clarifier. You can circulate the coolant with a cycling pump on the machine tool, a separate pump and motor, or by gravity flow.

Honan-Crane Corp., 702 Wabash Ave., Lebanon, Ind.

Compressed Air Cleaner

A device called Liqui-jector removes water, free oil, and dirt from compressed air or gas. Specially prepared liquid-impervious ceramic filters do the job. There are no moving parts. Liquids and dirt are said to be ejected automatically.

Liqui-jector will handle large volumes of air at high pressures in pneumatic systems. It's flanged for easy installation in your piping.

Selas Corp. of America, Erie Ave. & D Street, Philadelphia 34.

More on next page

Dearborn Check-Chart will help you stop rust before it starts!

Day and night, every minute of every hour, metal-hungry rust is destroying your valuable plant and equipment. You can stop rust now if you follow the simple Dearborn Plant Maintenance Survey.

With the Check-Chart as a guide, you can easily flag danger points where rust threatens—tanks, stacks, gutters, boilers and all metal surfaces throughout the plant. A NO-OX-ID coating, applied to these exposed metal surfaces, stops rust, *immediately*—before, and after, it starts!

Then, a simplified maintenance program will keep plant and equipment rust free . . . prevent costly production delays . . . wasted man-hours. A Dearborn representative will assist in selecting the correct NO-OX-ID to meet your requirements.

WRITE FOR YOUR COPY

Dearborn has prepared this helpful guide to money-saving maintenance as a service to all industry. Your Check-Chart and NO-OX-ID Plant Maintenance Survey will be furnished—without cost. The coupon is for your convenience.

Note Our New Address

DEARBORN CHEMICAL COMPANY
Merchandise Mart Plaza • Chicago 54, Illinois

Dearborn
Reg. U. S. Pat. Off.
THE ORIGINAL RUST PREVENTIVE
NO-OX-ID
IRON RUST

DEARBORN CHEMICAL COMPANY
Merchandise Mart Plaza, Dept. F
Chicago 54, Illinois

Gentlemen:

☐ Please send my copy of the Dearborn Plant Maintenance Survey.
☐ Have a Dearborn representative call.

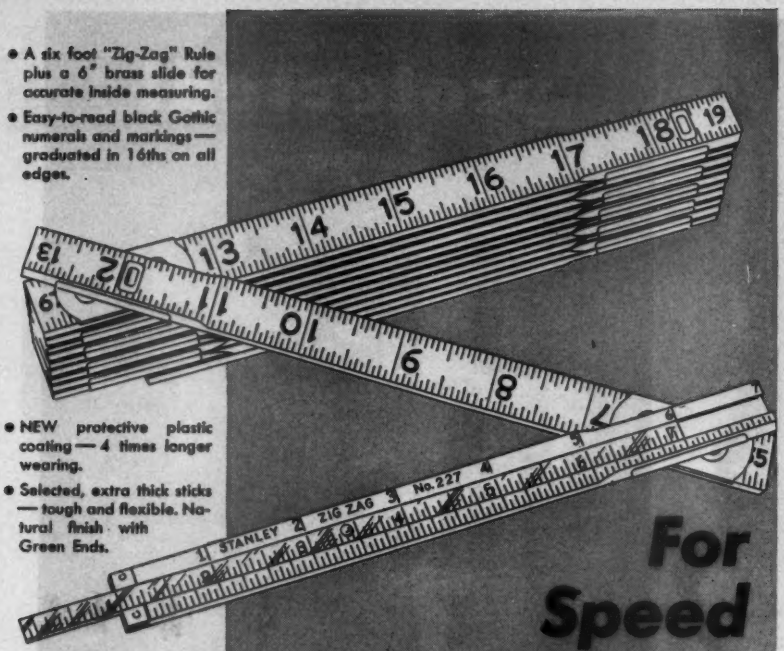
Name.....

Company.....

Address.....

City.....*Zone*.....*State*.....

- A six foot "Zig-Zag" Rule plus a 6" brass slide for accurate inside measuring.
- Easy-to-read black Gothic numerals and markings — graduated in 16ths on all edges.

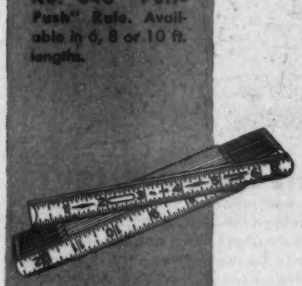


- NEW protective plastic coating — 4 times longer wearing.
- Selected, extra thick sticks — tough and flexible. Natural finish with Green Ends.
- Concealed joints with individually tested springs. "Ball socket" action prevents stretching.
- Exacting inspection and tests assure top quality.

For Speed and Accuracy

in measuring all kinds of work

No. 346 "Pull-Push" Rule. Available in 6, 8 or 10 ft. lengths.



No. 106 "Zig-Zag" Rule. All the features of No. 227 without extension. Durable white finish.

you can count on the No. 227 STANLEY Extension Rule

Accurate . . . durable . . . and easy-to-read Stanley Rules speed work, save time on all kinds of measuring jobs. Better *inch for inch,* Stanley Rules are simply constructed and last longer. Ask your distributor for Stanley Rules—there's a complete line of styles, sizes and markings for every industrial need.

STANLEY TOOLS • NEW BRITAIN, CONN.

STANLEY

THE TOOL BOX OF THE WORLD

Reg. U.S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

NEW AUXILIARY EQUIPMENT

Begins on page 172

Compact, Packaged Refrigeration Unit

Here's a compact refrigeration unit that's complete to the last pipe connection. The package includes reciprocating compressor, cooler, condenser, controls, piping, fittings, even cooler and condenser stands.

It's designed for chilled-water air conditioning in the 100- to 150-hp. range. You can also use it for direct product cooling, brine chilling, or ammonia and chlorine condensing. Freon, ammonia, or Carrene 7 can be used as the refrigerant.

Precise matching of components provides high operating efficiency and economy, say the Carrier people. And its compact size will fit in anywhere that space is critical.

Carrier Corp., 300 S. Geddes St., Syracuse, N. Y.

Gasoline Hand Pump

Safety was the prime consideration in designing this high-vacuum hand pump. It's mainly for dispensing gasoline and petroleum base products, but can be used with other industrial liquids. It has the Underwriter's seal of approval.

Bung adaptors come with a vise-type screw which can be tightened on the suction stub without wrench or pliers. Suction stubs are galvanized. All metal parts not made of stainless steel are Permolited to eliminate rust and corrosion. Model 972 has an 8-ft. static wire hose, vacuum breaker, and 8-gallon flow meter.

You can install these pumps in drums and tanks with 1½- and 2-in. bungs. Operating with a single diaphragm, they pump on both the backward and forward stroke, dispense 20 gallons per 100 strokes.

The Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.

More on next page

...LEUM! An ...ide range of ...ons for more ... film dries to ... that protects ... costs—adds ...faces, indoors ...

...ed over rusted ... the rust, assur- ...ration time... ... all the rust ...

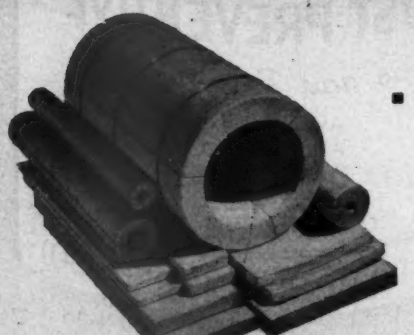
...Sweets ... ...

RUST-OLEUM CORPORATION

2451 Oakton Street, Evanston, Illinois

"Rigid Economy, Men"

KAYLO HEAT INSULATION



...Easy to Handle and Apply

Kaylo Heat Insulation is easy to handle and apply—in all sizes, shapes and thicknesses—because of its high structural strength and light weight. This remarkable combination of high strength and light weight makes possible speedier application. It provides for units of greater size which permit larger surfaces to be covered faster. With these combined features, Kaylo Heat Insulation gives exceptional ease of handling—offers substantial savings in application costs.

Kaylo Heat Insulation is a hydrous calcium silicate (not glass) with a wide effective temperature range—up to 1200°F. It is inorganic and insoluble in water, incombustible and retains its dimensional stability in long service under severe conditions.

KAYLO PIPE INSULATION is made to Simplified Dimensional Standards of thicknesses and diameters. Coverings are sectional for tube and pipe sizes ¼" to 12"; tri-segmental up to 23"; quad-segmental up to 41"; K-segmental (18" wide segments) up to 72" in diameter.

KAYLO HEAT INSULATING BLOCK is made in all standard sizes and thicknesses from 1" to 6" for flat surfaces and for vessels larger than 60' in diameter; curved block 18" wide for smaller vessels.

See our CATALOG in SWEET'S FILE

For complete details on Kaylo Heat Insulation, write Dept. N-202, Owens-Illinois Glass Company, Kaylo Division, Toledo 1, Ohio.

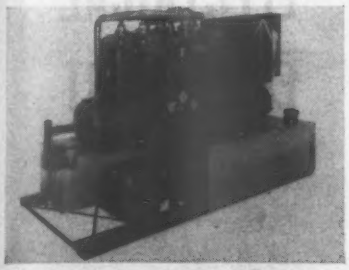
KAYLO® ...first in calcium silicate

...pioneered by OWENS ILLINOIS Glass Company

MAIN OFFICE: Toledo 1, Ohio — KAYLO SALES OFFICES: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Detroit Houston • Minneapolis • New York • Oklahoma City • Philadelphia • Pittsburgh • St. Louis • Washington

NEW AUXILIARY EQUIPMENT

Begins on page 172



Packaged, Heavy-Duty Water Chiller

Everything you need for heavy-duty industrial cooling is included in the Mayer Chil-Er refrigeration unit. You can use it as a water or brine cooler with adjustable temperature range. Refrigerating capacities range from 3 to 150 tons in eight sizes.

The Chil-Er is entirely self-contained and ready for operation when connected to water and power lines. One pushbutton controls a continuous, automatic supply of recirculated coolant. The Chil-Er adjusts itself to variable load and flow. The unit operates on either gravity or pressure water return without an additional pump.

All equipment is mounted on permanent steel skids that eliminate the need of any foundation or bolting down. Units are compact, pass through standard doors, can be easily relocated.

Mayer Refrigerating Engineers, Inc., P. O. Box 6, Rutherford, N. J.

Oil Reclaimer for Heavy-Duty Oils

You can use this Hilco oil regenerator for reclaiming heavy-duty mineral and detergent-type oils such as those used in lubricating diesel and gas engine compressors. The redesigned unit includes improved rotary-type pumps, a high capacity regenerative heat exchanger, and a new vacuum pump lubricating system.

Used oil is first filtered and vaporized to remove impurities and traces of moisture. Then, in the regenerative exchanger, heat is transferred to the cold incoming oil. Units are continuous and automatic in operation, have capacities ranging from 2 to 500 gph. For more details, write for company catalog.

The Hilliard Corp., 102 W. 4th St., Elmira, N. Y.

More on next page

Low-Cost Heating

FOR NEW BUILDINGS OR PLANT EXPANSION

Type 150 Suspended Unit Heater — propeller fan type; 60,000 to 150,000 Btu capacities; shipped assembled and pre-wired. AGA and UL approved.

Mueller Climatrol

GAS-FIRED UNIT HEATERS

— save costs, save space

For a compact, efficient heating system where time and costs are vital factors — the Mueller Climatrol unit heater line supplies the perfect answer!

✓ *Installation Cost is Low* — shipped pre-wired, completely assembled . . . just hang, connect to gas and power lines, and vent. No special chimney needed.

✓ *Operating Cost is Low* — efficient horizontal design assures maximum heat extraction, minimum fuel costs.

✓ *Maintenance is Easy*—can be completely cleaned and serviced from below without lowering the unit.

When you think of space-heating think of Mueller Climatrol. Capacities to fit any requirement.

Capacities and Types for Every Job

Blower Type 151 — Four sizes: 60,000 to 150,000 Btu input; all welded, horizontal design; AGA and UL approved. Shipped assembled and pre-wired.

Floor Type UH — nine sizes: from 180,000 to 540,000 Btu input in 45,000 increments; AGA approved. Easy to assemble and install.

94th Anniversary

Mueller Climatrol

TEAR OUT THIS COUPON AND MAIL TODAY!

L. J. Mueller Furnace Co.
2042F W. Oklahoma Ave., Milwaukee 15, Wisconsin

Please rush me complete information on space-saving and cost-saving Mueller Climatrol unit heaters.

Name.....

Position.....

Company.....

Company Address.....

City.....(.....) State.....

E-154A

Check this better

CONTROL CENTER for

PRODUCTION CONTROL

☐ Order Changes ☐ Coach Orders (Railroads)

☐ Maintenance and Repairs ☐ Machine Loading

☐ Production Scheduling and Dispatching

☐ Production Control (Followup, Expediting)

☐ Rollers, Shears, Pits, Scales

☐ Program Scheduling (Radio)

☐ Power Control

MATERIAL CONTROL

☐ Inventory Control ☐ Loading Weight Check

☐ Expediting ☐ Purchasing

☐ Receiving and Stores ☐ Requisitioning

☐ Reserve Stock ☐ Tool Control

QUALITY CONTROL

☐ Banbury Process ☐ Blast Furnace

☐ Open Hearth, Bessemer, Electric Furnaces

☐ Testing, Inspection ☐ Laboratory Analysis

Wire-transmitted telescriber messages are exact reproductions of the sender's handwriting. A system of electronic controls transcribes the sender's writing instantly on the paper in telescribers at one or more receiving points.

Unrestricted by set keyboards, the telescriber does not require a specially trained operator. The telescriber message is your permanent record of codes, formulae, diagrams, etc.

For complete information write Dept. B-5.

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MANUFACTURERS

Food • Textile • Lumber
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Transportation Equipment

Handwritten Messages Deliver Themselves . . . While You Write

WHAT'S NEW IN EQUIPMENT

Begins on page 144

ELECTRICAL EQUIPMENT

Motor Control Center

Here's another load center that applies the "building block" principle to motor controls. The Multitrol system uses prefabricated control units assembled and wired into free standing steel enclosures.

There are two standard-size sections—76 or 90 inches high, 20 inches wide, and 20 inches deep. Sections accommodate control systems up to 600 volts, in sizes up to NEMA 5—one for each motor. Controls are NEMA Type A, B, or C.

Multitrol is available with a range of motor starters equipped with externally operated circuit breakers, thermal overload and low voltage protection. Other features are standardized busses, simplified wiring, local or remote control.

Ward Leonard Electric Co., 31 South St., Mount Vernon, N. Y.

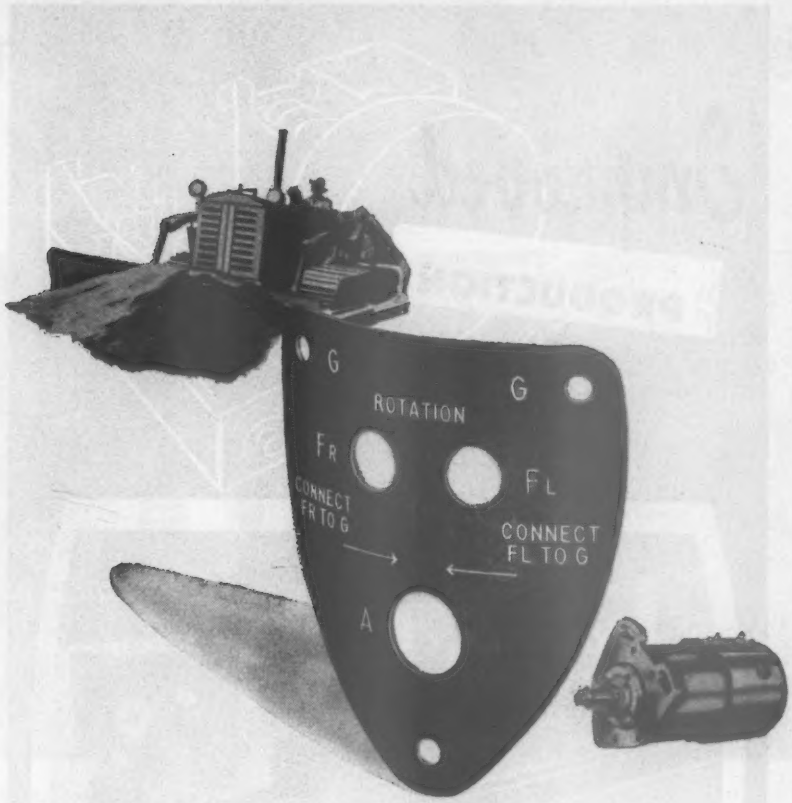
High-Accuracy Regulator Controls

Regulator controls said to be at least 99% accurate regardless of temperature or load change are now standard on all G-E stationtype induction and step regulators.

They are designed to meet ASA requirements for Class 1 accuracy. The new controls allow feeders to carry heavier loads for greater distances. Greater feeder drop can be tolerated without exceeding permissible voltage limits.

General Electric Co., Transformer & Allied Products Div., Schenectady 5, N. Y.

More on next page



How to move mountains—non-stop

When it comes to moving mountains—or spreading the landscape around—you can't beat bulldozers.

You can, however, beat a bulldozer if you put into it a part that can't stand the gaff.

An example is the generator. Vibration, abrasive dust, weather, shifting stresses and stray oils or greases are constantly taking their hardest licks at it. It leads a tough life.

That's why American Bosch Corporation, makers of dust-proof, heavy-duty generators for industrial tractors and bulldozers, selected Synthane laminated plastics for the insulation plate shown above.

Synthane is a material for industry. It possesses an unusual *combination* of physical, mechanical, chemical and electrical properties.

Synthane is light, strong, dense, abrasion resistant. It is easily machined or produced in formed shapes. Dielectrically strong, it is a natural for electrical applications. Synthane is corrosion and fungus resistant, chemically inert, stable over a considerable temperature range.

If this capsule description of Synthane excites your imagination, send for the complete Synthane catal Synthane Corporation, 4 River Road, Oaks, Pennsylvania.

PLASTICS WHERE PLASTICS BELONG

SYNTHANE

NEW ELECTRICAL EQUIPMENT

Begins on page 178

Weatherproof Junction Boxes

This weatherproof, cast aluminum junction box comes with a variety of covers and fittings for different outdoor wiring installations. The box itself has four hubs tapped ½-in. IPS. It comes with or without mounting lugs.

One type of aluminum cover is threaded to take standard lamp holders for 150-, 200-, and 300-watt reflector bulbs. The junction box can be used effectively in this manner for protective floodlighting and the lighting of yards, loading platforms, and property lines. For straight wiring jobs, there's a flat aluminum cover plate sealed with a heavy cork gasket.

Stone Mfg., Co., 489 Henry St. Elizabeth 4, N. J.

Geared-Head Motor With Motor-Mounted Brake

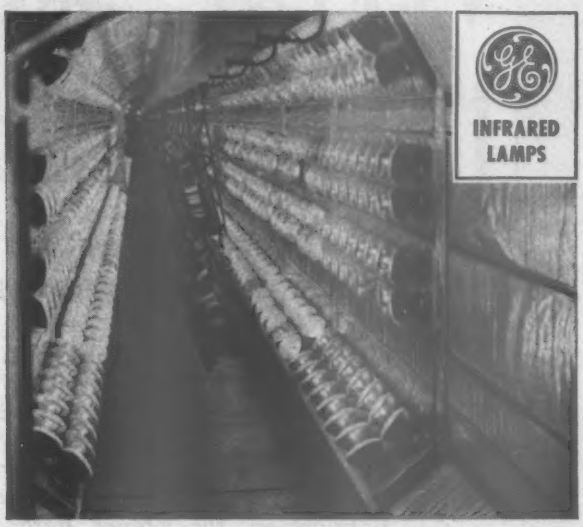
This fan-cooled motor has its own disc-type brake. Both motor and brake are totally enclosed and dust tight, so that you can use it in atmospheres containing non-explosive dust and vapors. Brake is set for stopping or holding service.

The double reduction power drive is made in ratings of from 2 to 15-hp. Speeds range from 280 to 30 rpm. Otherwise its features are the same as those in Sterling's standard fan-cooled Slo-Speed line.

Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Rd., Los Angeles.

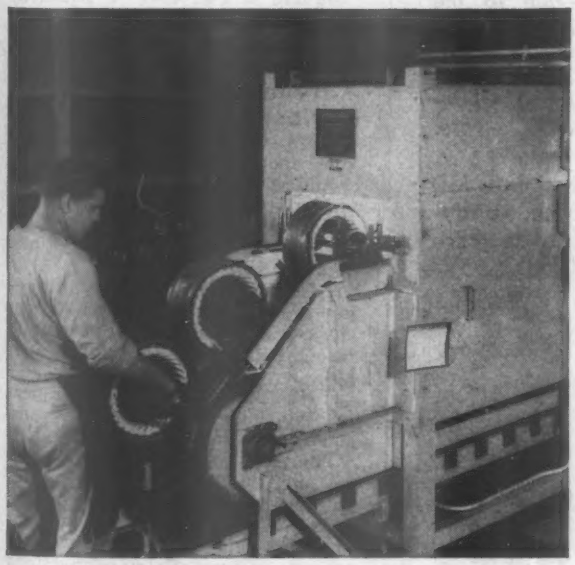
More on next page

87% saving in time, 75% saving in space reported for G-E infrared lamps



1 QUICKER BAKING. The Phil R. Hinkley Company of Cleveland reduced baking time 87 per cent by using General Electric infrared lamps in the two ovens shown here. G-E infrared gives you quick heat at low cost—can save you time and money in a wide range of finishing, dehydrating, and drying applications.

2 LESS SPACE. Infrared ovens are compact, require less floor space and are easy to install overhead and out of the way. Many manufacturers report savings in space up to 75%. If you need room to expand, or have crowded finishing areas, General Electric infrared lamps can save you space . . . and money.



3 CLOSER CONTROL, TOO! If you have a tricky process that demands just the right amount of heat, General Electric infrared lamps may be your answer. You'll get clean heat that can be controlled within narrow limits. G-E infrared assures the dependable heating necessary to maintain product uniformity, as in this installation at ILG ELECTRIC VENTILATING CO., in Chicago.

General Electric makes a complete line of infrared lamps—125 to 1000 watts, both clear and reflector types. For more information, write General Electric, Div. 166-FMM-5, Nela Park, Cleveland 12, Ohio.

FREE BOOKLETS ON INFRARED

"Bake-Dry-Heat with G-E Infrared Lamps." Gives advantages of infrared heating.

"Industrial Infrared Lamps". Where and how to use them.

For your free copies, write General Electric, Div. 166-FMM-5, Nela Park, Cleveland 12, Ohio.

GENERAL ELECTRIC

Now..

MD 565W

ALUMINUM PASTE

..meets Federal Specification TT-A-468a, Type II, Class B

USE ALUMINUM PAINT ...cut maintenance costs

- Lasts longer
- Increases visibility
- Improves lighting
- Hides with one coat
- Resists corrosion
- Keeps surfaces dry
- Reduces heat losses
- Looks attractive
- Promotes safety

Complete line of MD ALUMINUM PIGMENTS meets all the requirements of a wide range of standardized and specialized Aluminum Paint applications.

An ideal pigment for industrial and maintenance paints

MD 565W is a standard lining type Aluminum pigment of high diffuse reflectivity. For exterior painting it yields whiter, brighter films with suppressed high-lighting and spotty glare, resulting in the elimination of overlap marks and irregular "checkerboard" patterns. Provides greater brightness for interior surfaces. Also meets A.S.T.M. Spec. D 962-49, Type II, Class A.

MD 565W provides these 3 big advantages:

★ **NO GLARE**—*produces a finish with greater light reflectivity, without glare.*

★ **IMPROVED APPEARANCE**—*due to the whiter, brighter finish it produces.*

★ **REDUCED MAINTENANCE COSTS**—*because of its greater degree of whiteness, color change is at a much lower rate.*

In your aluminum painting, specify that MD 565W be used in the formulation of the ready-mixed Aluminum Paint you purchase. In those paints which you formulate, specify MD 565W in your pigment purchases.

SEND FOR — your copy of Bulletin 505

METALS DISINTEGRATING COMPANY, INC.

General Offices: Elizabeth B, New Jersey

Sales Offices: Chicago, Ill., Cleveland, Ohio

Plants: Elizabeth, N. J., Manchester, N. H., Berkeley, Calif., Emeryville, Calif.

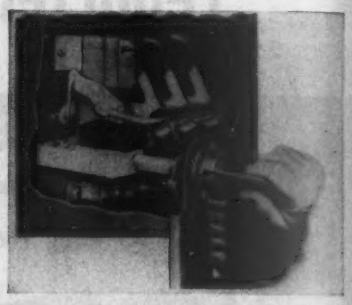
1200

MD POWDERS Since 1916

ALUMINUM PASTES
ALUMINUM POWDERS
GOLD BRONZE POWDERS

NEW ELECTRICAL EQUIPMENT

Begins on page 178



Operating Disconnect for Control Panels

This disconnect switch is for manufacturers who assemble their own control panels. It's designed for safety and convenient mounting.

You can mount the mechanism directly on your panel without posts or brackets. A coupling rod from the disconnect engages a separate operating handle mounted on the door. You select the length of this rod to conform with the depth of your panel. To compensate for any errors, an additional adjustment of ±¼ inch is built into the coupling.

Switch design includes visible blades, dead-front construction, positive-pressure fuse clips, and silver-plated conductors. Interlocks and padlocking arrangements assure complete operator safety.

Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.

Automatic Relay for Reclosing Breakers

G-E's type ACR reclosing relays keep feeder lines in service that would otherwise be knocked out by temporary faults. They can be set to reclose any type of power circuit breaker—either immediately or after a set time delay.

Features claimed for the new relay are (1) faster immediate reclosure, (2) optional automatic reset of breaker at a definite time after any successful reclosure, and (3) a self-contained means for permitting instantaneous initial and subsequent time-delay tripping.

The ACR relay may be adjusted for one, two, or three delayed reclosures in addition to immediate reclosure. You can set the interval between delayed reclosures at 15 seconds or more. Relay connections can be easily changed to omit the immediate reclosure.

General Electric Co., Switchgear Div., Schenectady 5, N. Y.

More on next page

On thousands of applications in every field of manufacture, stepless variable speed operation assures exactly the right speed for every operation . . . for every operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a more uniform better quality product and more efficient performance of your equipment and your operators.

Master Speedrangers provide this infinitely variable speed in an all metal, mechanical variable speed unit whose compactness and durability are extra features which help you make a good job better. And nowhere else will you find variable speed drives that are so flexible, so easily adaptable and in such a wide range of types and sizes.

makes a good job better

For example, look at the plastic forming machine shown below. The Speedranger, on the drive unit incorporates an electric motor, a variable speed unit and a gear reduction . . . all standard Master units that easily combine into one compact, integral power package. This provides exactly the right speed, the right features, in a unit that you can mount right where you want it.

Probably you will not need this same combination of features. However, the next time you need a drive for material processing, handling, and conveying equipment; mixers and agitators; welding-positioners; macnine tool drives; testing and calibrating equipment . . . to name only a few . . . see what a really remarkable job Master Speedrangers can do for you. Write for Data 7525, new twenty-four page booklet on Speedrangers.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

especially when you use

MASTER SPEEDRANGERS

Rubber-base (Parlon®) Paints GIVE EXTRA PROTECTION against Acids and Alkalies

Where other paints fail because of acid or alkaline plant conditions, it may pay you to specify corrosion-resistant, rubber-base paints. For concrete and most metal surfaces, paints properly formulated with "Parlon" (Hercules Chlorinated Rubber) are unsurpassed for resistance to common destroyers of maintenance paints. Besides alkali and chemical resistance, these paints have outstanding wear resistance, dry fast, and are easy to apply.

More than 500 paint manufacturers now offer one or more rubber-base paints made with chlorinated rubber. These maintenance paints may cost a little more per gallon, but usually cost far less per square foot per year. We'll be glad to supply the names of several firms in your locality who can advise you.

HERCULES POWDER COMPANY
905 Market St., Wilmington, Del.

Send further details on "Parlon" paints and names of suppliers.

Name_____

Company_____

Address_____

CR51-1

Begins on page 144

LIGHTING

Vaportight Fixtures

Speedy installation, simple maintenance are the features of the Appleton V-51 Series of vaportight lighting fixtures. The line includes 18 types of malleable iron fixtures for pendant, ceiling, or bracket mounting on rigid conduit.

Ease of maintenance results from unit assembly construction. In relamping or cleaning, the receptacle (above) containing lamps, vaportight globe, and guard can be unscrewed from the fixture as a single unit without tools.

Fixture bodies are grooved to mount 10, 150, or 250 watt reflectors in four styles. Reflectors have neoprene rubber grommets around their inner rim, so that they can be snapped on and off easily.

Appleton Electric Co., 1701-59 Wellington Ave., Chicago 13.

•

OPEN CHANNEL STRIPS on Tra-Bak fluorescent fixtures simplify installation and maintenance. Ballast, starter, sockets, and all wiring are mounted on these strips. To get at the whole works, you just lift off the reflector. For continuous row installation of Tra-Bak fixtures, all you need are threaded nipples and lock nuts. Great Northern Mfg. Corp., 4217 Harrison St., Chicago 24.

100-WATT ROUGH SERVICE LAMP, smaller than standard 100-watt bulb, gives added candlepower to wire-guard extension-cord equipment. This lamp fits into guards previously limited to lower wattage bulbs. It's more resistant to breakage, too. Westinghouse Electric Corp., MacArthur Ave., Bloomfield, N. J.

More on next page

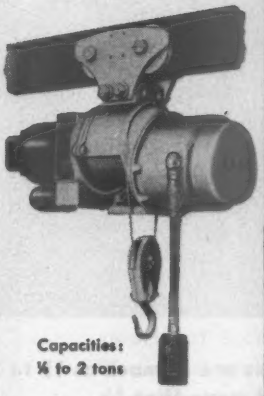
SPECIFIC PROBLEM...

SPECIFIC ANSWER!

YOU'LL GET MORE DONE WITH A HOIST THAT'S EXACTLY RIGHT...

...for continuous quick-lifting power

YALE LOAD KING ELECTRIC HOIST



Capacities: ½ to 2 tons

Wherever a rugged, moderately priced, light-duty hoist is indicated, this new YALE is a "natural." It can stay on the job 'round the clock, continuously lifting at speeds ranging from 9 to 41 F. P. M.! Push-button provides split-second one-arm control for easy "inching" and spotting of load. Motor and load brakes protect load and operator even when power is off. Available in wire rope or chain models with trolley, lug or swivel hook suspension.

...for dependable general-purpose lifting

Capacities: ½ to 1½ tons

YALE MIDGET KING ELECTRIC HOIST

Here's a YALE money-saver that fills the bill perfectly on a thousand-and-one lifting jobs. Get speedy lifting, fast, accurate spotting of loads. One-hand bar control leaves operator free to guide loads as he lifts or lowers. Non-fracturing steel load hook. Trolley or swivel hook suspension models available, AC or DC.

and there are many more!

A YALE HOIST FOR EVERY JOB

Get all the facts today! ➡

The Yale & Towne Manufacturing Co., Dept. 35
Roosevelt Boulevard & Haldeman Avenue
Philadelphia 15, Pa.

Please show me how I can step up production with YALE hoists.

_____ *Please have your local representative call on me.*

_____ *Please send me FREE detailed literature.*

Name_____

Company_____

Street_____

City_____ State_____

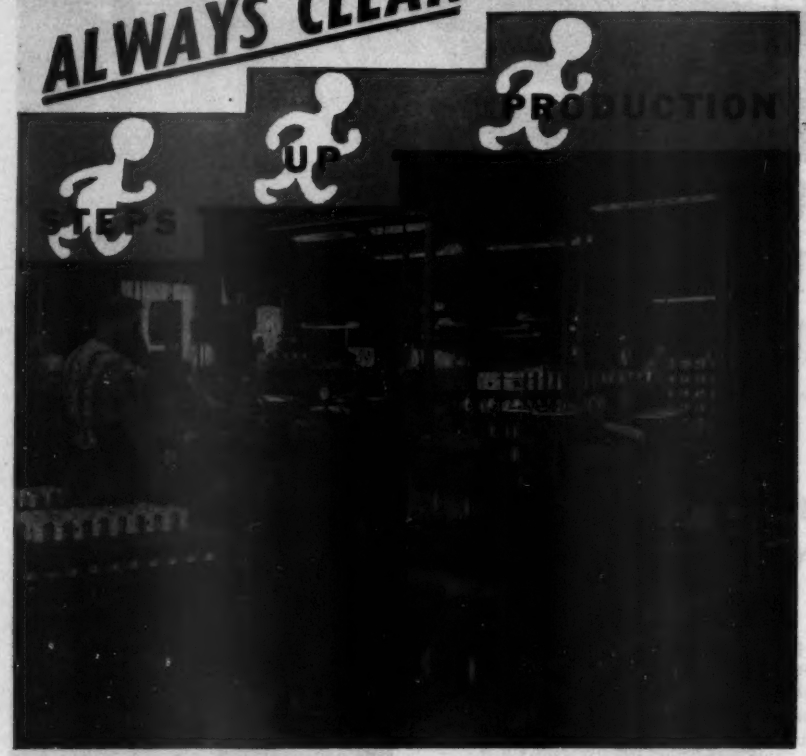
YALE MATERIALS HANDLING EQUIPMENT

THE YALE & TOWNE MANUFACTURING COMPANY

In Canada write The Yale & Towne Manufacturing Company, St. Catharines, Ontario

YALE is the registered trademark of The Yale & Towne Manufacturing Co.

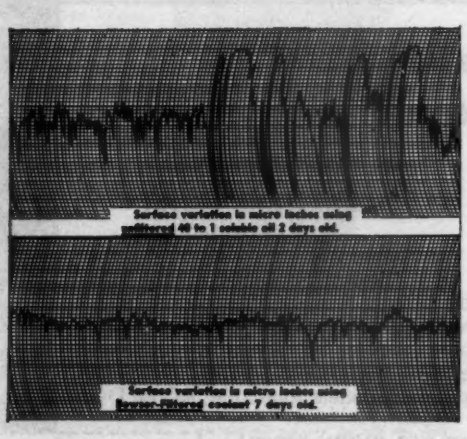
how... ALWAYS CLEAN COOLANT



- **Cutting and grinding operations are as much as 15 to 20% faster.**
- **Rejections are usually reduced more than ½.**
- **Longer tool and wheel life—up to 25%—cuts machine downtime.**

These surface variations are from tool steel, rectangular snap gauge blocks of 63-65 Rockwell hardness which were FINISH-GROUND to .0001 tolerance, to be lapped later to a tolerance of 1/200,000.

Rejections averaged 25% with unfiltered coolant — were reduced to less than ½% when Bowser-filtered.


Surface variation in micro inches using unfiltered 40 to 1 soluble oil 2 days old.
Surface variation in micro inches using Bowser-filtered coolant 7 days old.

There's a Bowser cutting oil or coolant filter ideally suited for any metalworking requirement.

Our nearest sales engineer will welcome an opportunity to discuss your coolant filtration problems. May we have him call?

BOWSER, INC.,

1352 CREIGHTON AVENUE
FORT WAYNE 2, INDIANA

MAINTENANCE TOOLS & SUPPLIES

Pump-Operated Hole Puller

A pump-operated Ohio Draw Bar pulls holes in metals up to 10 gage in less than a minute. You can use it for placing holes up to 4 in. in diameter in sheetmetal, switch gear housings, and outlet boxes—without the manual exertion of hand-operated punches.

A 30-lb. press on the handle produces a 12,000-lb. pressure on cutting surfaces. It's said to cut a smooth-edge hole with no warping or tear. You can use standard knockout punch cutters.

Patterson Equipment Co., P. O. Box 163, Denair, Calif.

LP-Gas Heat Tools

Fire pots, tinner furnaces, and hand torches in the Clayton & Lambert line operate on liquid petroleum gas.

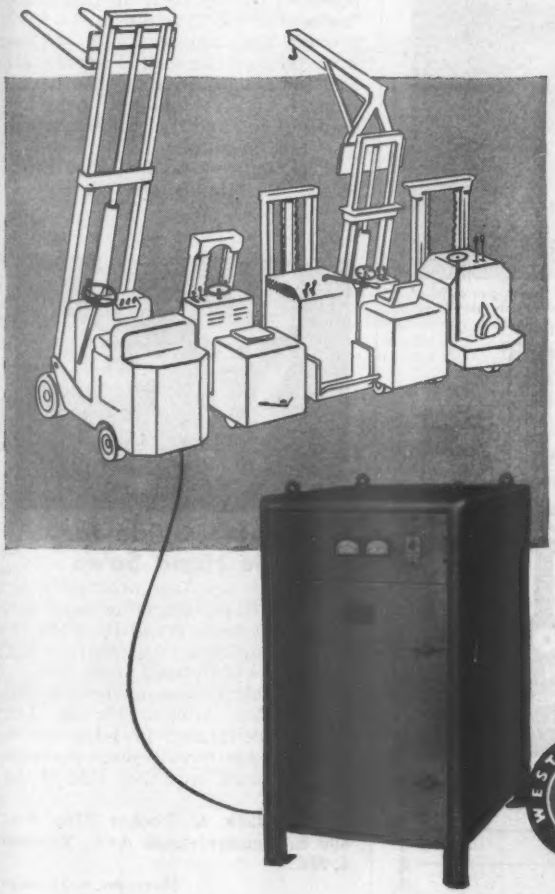
You can mount the fire pot directly on top of a 20-lb. propane cylinder—or operate it as a bench unit connected to any LP-Gas tank. Special adaptors enable you to use the fire pot in combination with a melting pot, hand torch or tinners furnace. The unit will hold an 8-in. pot, melt 40 lb. of lead in 4 minutes.

The tinners furnace operates from a 2-lb. propane tank. It provides an intense flame for heating large or small coppers to desired temperature.

Clayton & Lambert Mfg. Co., 1701 Dixie H'way, Louisville 10, Ky.

More on next page

"Now we use just one type of battery charger— RECTOX!"



You don't need a special charger for each of the many models of industrial truck batteries in use today. Westinghouse Rectox Dual-Purpose Charger is designed to service most of these batteries. One unit charges either Lead-acid or Nickel-alkaline-type batteries . . . covers the wide range 200 to 500-ampere hours; 15 to 24 cells to change from one type to the other; just flip a switch. What's more, you get these features also:

- **No taps to change—charging cycle is completely automatic.**
- **No energy wasting resistor. No moving parts.**
- **Current selection by simple twist of dial.**

MORE DATA? Ask your Westinghouse representative for a copy of DB-19-040 or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-21621

YOU CAN BE SURE . . . IF IT'S Westinghouse

Rectox

INDUSTRIAL TRUCK CHARGERS

THE NEW MOBILIFT Tier-Master

Lifts 117" Floor-to-Forks

...yet with only 72" overall height

The Tier-Master's telescoping roller chain-driven* uprights actually lift 117 inches from FLOOR-to-FORKS from an overall collapsed height of only 72 inches.
*Allow UNOBSTRUCTED view between UPRIGHTS.

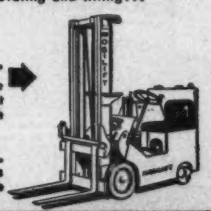
STAND-UP MODEL "E" TIER-MASTER. 2,000-pound capacity with 72" Mast (Free Lift 47"; Mast Ht. Extended 142") outside turning radius 57". *Also available with 63" and 83" masts.*

This Lev-R-Matic Drive Fork Lift Truck Easily Enters Truck Bodies and Low Clearance Doors, yet Tiers 3 Pallets High.

2-Way PUSH-PULL levers give operator finger-tip control of forward-back movement, elevating and tilting...

Lev-R-Matic DRIVE ...NO GEARS TO SHIFT

NEW "SIT-DOWN" MODEL "ER" 2,000-lb. capacity on 15" load center; outside turning radius 63"; shown with 83" Mast. (Lift Ht. 108"; Free Lift 57".) *Also available with 63" mast.*



"MOBILIZE" Your Materials Handling . . . WRITE TODAY for Complete Specifications on Tier-Master and other Lev-R-Matic Drive MOBILIFTS.

MOBILIFT Lev-R-Matic DRIVE

MOBILIFT CORPORATION

835 S. E. MAIN ST., PORTLAND 14, OREGON
2317 W. 18th, CHICAGO · 790 Patterson Ave., E. RUTHERFORD, N. J.
1113 Spring St. N. W., ATLANTA · 2724 Taylor St., DALLAS
2730 San Pablo Ave., BERKELEY

Without obligation please send your new MOBILIFT Lev-R-Matic Drive specification bulletins.

Name_____

Firm_____

Address_____

City_____ Zone_____ State_____

NEW MAINTENANCE TOOLS & SUPPLIES

Begins on page 186

Hand and Band Saw Setter

If you set your own saws, you may want the Foley saw setter to do the job for you automatically. It handles hand or band saws, sets both sides of the saw in one pass through the machine. Band saws having 4 to 8 points per inch can be set at speeds from 4 to 15 seconds per foot.

There are two hammers—both powered by the same spring. This "twin hammer" action is said to provide high uniformity of set for both sides of the saw. You can adjust the machine for any tooth size from 4 to 16 points per inch, for depth of set, and for saw thickness. The rest is automatic.

B. G. Foley Mfg. Co., 3300 Fifth St., N. E., Minneapolis 18.

Protractor Guide for Portable Hand Saws

You can use this protractor together with your circular hand saw to lay out any carpentry work involving angles. It's especially handy for making compound miter cuts.

The protractor is made of metal for rigidity, weighs 1½ lb. The scale is calibrated in 1-deg. units. You can use it with most portable electric saws, on either side of the shoe.

The Black & Decker Mfg. Co., 600 E. Pennsylvania Ave., Towson 4, Md.

More on next page

COMPLETE

SYSTEMS

for ENAMEL • LACQUER • PAINT

Ultramodern Plant of the Danuser Machine Company, Fulton, Missouri. Note Finish Baking Oven of a Complete Modern Finishing System is Located on the Roof.

Illustration Above Shows Compact Arrangement of a Complete Mahon Finishing System Designed to Handle Finishing Production in a Comparatively Small Plant.

Loading and Unloading Area. Two-Stage Cleaning Machine and a Two-Color Flow-Coating Machine are in the Background.

Small Plant Operators, Too, CUT FINISHING COSTS with MODERN MAHON EQUIPMENT!

While the Mahon Nameplate appears on Finishing Equipment in almost every large production plant in the country, it is singularly significant that so many comparatively small companies also pay a little more for modern Mahon equipment. The Danuser Machine Company, Fulton, Missouri, manufacturers of earth moving equipment and farm tools, is a typical example. This company operates a Complete Mahon Finishing System specially designed to meet its specific production requirements . . . the completely conveyorized system consists of a two-stage Cleaning Machine, Dry-Off Oven, a two-color Flow-Coating Machine and a Finish Baking Oven—the latter being an outdoor oven installed on the roof to conserve space. The owner of this plant is one of many small plant operators who have found that their finishing equipment requirements will receive from Mahon the same careful preliminary study, and the same experience-backed planning and engineering that goes into finishing systems installed for the largest plants in the world. If you are contemplating new equipment, do not hesitate to call in Mahon engineers . . . you will benefit from a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File for complete information, or write for Catalog A-650.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

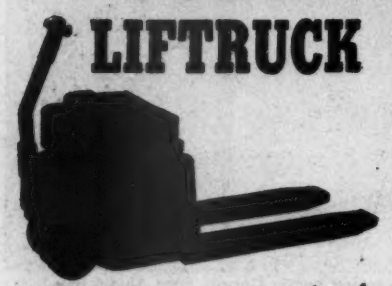
Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning and Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-Off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens; Core Ovens, Dust Collecting Systems, Fog-Filters, and many other Units of Special Equipment.

MAHON

Gives ONE MAN the strength of FIVE!

GO-GETTER

Pallet Type POWER LIFTRUCK



This walk-along electric truck is compact, powerful . . . gives one man the strength of five. Go-Getter lifts full four inches in only four seconds, drops loads gently and quietly. It rides smoothly on uneven surfaces. Braking is safe and easy. This power-operated dual drive wheel liftruck is strong, maneuverable, stable . . . has 200° turning arc and low center of gravity. Comes in 2-ton and 3-ton models. Send coupon today for Bulletin.

BULLETIN

REVOLVATOR CO.

DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT SINCE 1904

8761 TONNELE AVENUE, NORTH BERGEN, N. J.

Without obligation, please send bulletin on Go-Getter Pallet Type Power Liftrucks.

Name _____

Position _____

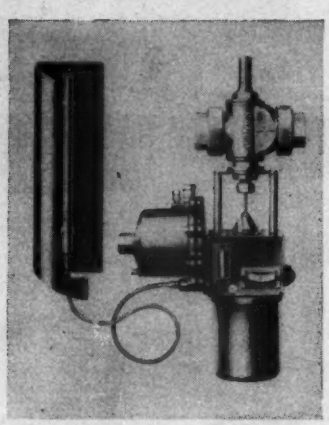
Company _____

Address _____

_____

RE-101

MEASURING & CONTROL APPARATUS



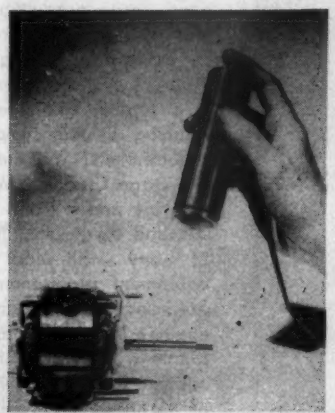
Weather-Minded Heating Control

This Type W Sarcostat automatically feeds just enough steam to a building, heating zone, or individual convector to balance its heat loss against the outside weather.

You can install it in new or existing steam heating systems. Equipment includes a motor-controlled steam modulating valve, an outdoor sensing bulb, and a control panel.

The outdoor bulb acts to open the control valve wider as the weather gets colder. The valve, however, is also regulated by steam pressure. So it won't open any wider than is necessary to maintain sufficient steam pressure in the system. Through the control panel you can set the system for night shutdown, quick morning pickup at any set time.

Sarco Controls, Inc., Empire State Bldg., New York 1.



Flashlight-Type Stroboscope

Here's a low-cost, portable stroboscope for checking the speeds of rotating devices that operate in synchronism with your line frequency. You can use it for field servicing or production testing of synchronous motors and generators, and timing devices.

Compact and light in weight, it's said nonetheless to have extreme accuracy. Operating like a flashlight with a simple button switch, the Synchroscope provides an instantaneous light source that pulses at the line frequency. It's quick reading. No warm-up time is needed. The Synchroscope comes equipped with line cord and plug.

The Synchroscope Co., 57 William St., New York 5.

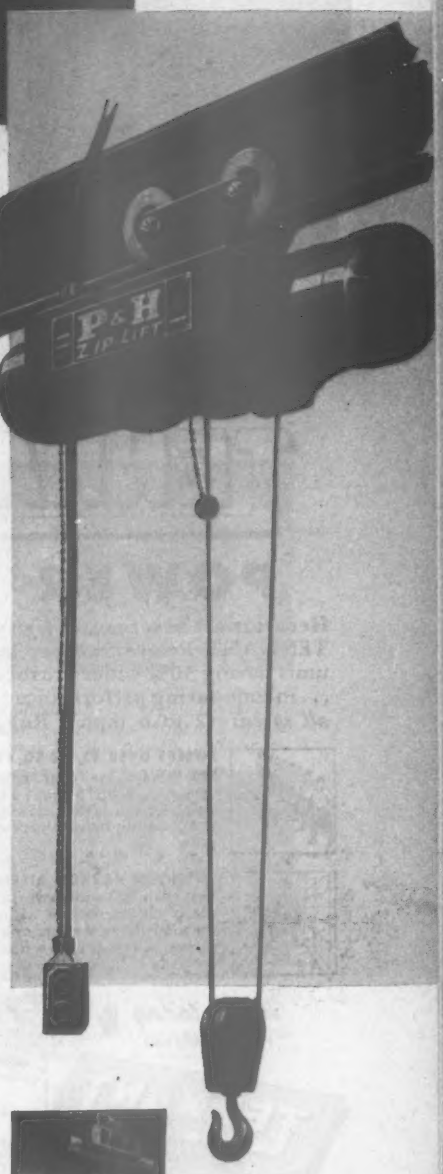
Automatic Batch Counter

Continuous, automatic counting of preselected batch quantities is possible with this electric device. You can use it on high-speed lines without interrupting production. Unit comes in 2-, 3-, 4-, and 5-digit models. You can use one to start or stop machinery, conveyors, signals, kickout devices, and the like. They'll count any object or motion that can be made to operate a switch, relay, or photo-electric unit.

Production Instrument Co., 700-06 W. Jackson Blvd., Chicago.

More on next page

GET SET TO SAVE MAN-HOURS



WITH A ZIP

HANDLE IT "thru-the-air"!

In thousands of plants the Zip-Lift is saving millions of hours — letting workers make the most of their time and skills — with the effortless speed of "thru-the-air" handling. Along production lines, beside machine tools, on shipping platforms — wherever loads are handled frequently — your workers can merely press buttons, and the Zip-Lift does the rest.

And remember — there's no substitute for Zip-Lift quality and reliability.

You pay so little more for ADDED VALUES like these:

SAFER Full magnetic control with current reduced to 110 volts at push button. Plugging crane type limit switch. Large double brakes. For *your* protection, P&H never stretches a motor rating.

LIFETIME CONSTRUCTION Precision-built — shaved gears run in oil — grease-sealed bearings — fully enclosed.

P&H

ELECTRIC HOISTS
4525 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

SEE YOUR ZIP-LIFT DEALER, or write us for Bulletin H-20-1 —it's filled with time-saving ideas for you.

INS • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLER AND TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

TENNANT

MODEL 24

POWER SWEEPER

Here, for the first time, is *big* sweeper capacity . . . in an aisle-sized TENNANT Power Sweeper less than 29" wide! Outsweeps some units having 50% wider brushes. Offers your plant NEW advantages . . . in time-saving performance . . . easy handling . . . *clean sweeping at all speeds* (2 to 8 mph). Rugged, vacuum-equipped, easy to use.

SWEEPS OVER 43,500 SQ. FT. PER HOUR. Cuts your floor sweeping costs! Sweeps 24" path; does a faster, cleaner job than big handsweeping crew.

HAS VACUUM DUST CONTROL—aids plant hygiene; avoids dust nuisance. Brush rotates *inside* vacuum-ized compartment!

SWEEPS IN NARROW AISLES. Less than 29" wide, sweeper easily cleans narrow aisles on-the-run, as well as open areas. Easy front-wheel steering.

IS GEARED FOR ALL JOBS... HAS 2-SPEED TRANSMISSION so brush-and-vacuum are efficient at *all* speeds! Also REVERSE gear and AUTOMATIC clutch.

Write today FOR FULL DETAILS

G. H. TENNANT CO.
2554 N. 2nd St., Minneapolis 11, Minn.

Please send NEW ILLUSTRATED BULLETIN describing your Tennant Model 24 Power Sweeper. Include cost-saving data.

Name_____
Firm_____
Address_____

INDUSTRIAL FLOOR MACHINES

CREATORS OF THE TENNANT SYSTEM OF FLOOR MAINTENANCE · MANUFACTURERS OF EQUIPMENT AND MATERIALS FOR MAINTENANCE OF FLOORS, DECKS, ROOFS, HIGHWAYS
OFFICES IN PRINCIPAL CITIES

NEW MEASURING & CONTROL APPARATUS

Begins on page 190

Pocket-Size pH Meter

Here's a neat pocket-size meter and probe unit for on-the-spot pH determination. With it you can check the acidity or alkalinity of chemical solutions without dragging samples off to the laboratory.

The unit weighs only 3 lb. It fits into a camera-type carrying kit that your chemist can sling over his shoulder when he makes his rounds.

The meter is scaled from 2 to 12 pH. But you can read the full 0 to 14 range with a simple adjustment. Accuracy is ±0.1 pH. Hearing-aid-type batteries are good for up to 1300 hours of operation.

Analytical Measurements, Inc., 585 Main St., Chatham, N. J.

Strip Chart Recorder

The Multipoint Capacilog is a direct-reading non-balancing recorder said to have an accuracy previously obtainable only in potentiometric or null-type systems. Accuracy is .25% of the full scale reading.

The Capacilog is a deflection-type strip recorder. There's provision for up to six permanent records on each chart. You can attach it to any sensing unit producing an electrical signal.

Wheelco Instruments Co., 847 W. Harrison St., Chicago 7.

Improved Pyrometers

Simplytrol's latest pyrometer controls can be set more accurately and read at a greater distance. They have a large 4½-in.-scale indicating meter. Series 4530 provides automatic on-off control at a set temperature. Series 4540 is a shut-off limit control.

Assembly Products, Inc., Main at Bell St., Chagrin Falls, Ohio.

More on next page

Keller Screw Drivers and Nut Setters used in the assembly of phonograph record-changers.

Keller Open-End Ratchet Wrench used to install flexible tubing. This style can be slipped over the tubing to draw up the nut.

Smaller Stock of Maintenance Parts Needed for "KELLERIZED" Assembly Lines

A big advantage of Keller Air Tools, from management's viewpoint, is that only a small maintenance parts inventory is required.

This is because Keller Tools are designed with fewer parts and extreme simplicity, which leaves little to get out of order.

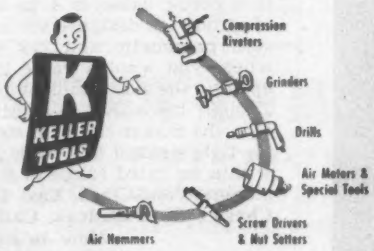
Parts are interchangeable, making the tools readily adaptable from one job to another. They are easy to take down and reassemble when repairs or job adaptations are necessary.

Employees like the light weight and "balance" of Keller Tools, because it greatly reduces worker fatigue.

Let our engineers "Kellerize" your production and assembly lines. There are Keller Screw Drivers, Nut Setters, Ratchet Wrenches, Die Grinders, and other air-powered tools to meet almost every job requirement.

In fabricating electrical control switches, Keller Screw Drivers are used to install spring and contact units in the plastic framework.

Control levers for circuit breakers are attached with half-inch nuts. Keller Nut Setters are used to tighten down the nuts.



KELLER

Pneumatic Tools

KELLER TOOL COMPANY, GRAND HAVEN, MICH.

CM CYCLONE

LIGHT WEIGHT — HEAVY DUTY

High Speed CHAIN HOIST

There's nothing to compare with it! ***63% Less Weight:*** Of Alcoa Aluminum Alloy, the 1 ton capacity weighs only 35 lbs. Carry it anywhere with ease. Designed to stand the "gaff" of maintenance work. ***42% Fewer Parts:*** Long service life. ***96% Efficient:*** Lifts loads rapidly with easier pull on the chain. ***Herc-Alloy Flexible Load Chain:*** America's first welded alloy steel chain. ***Sealed-in Lifetime Lubrication:*** No attention required. ***Low Cost:*** No more than heavy old style chain hoists. Capacities: ¼ to 10 tons.

CM PULLER

The tool of a thousand uses for lifting, pulling, skidding, stretching, straightening. Use it vertically, horizontally, diagonally... any angle. Eliminates the dangers of makeshift methods. Holds the load where you leave it. Compact, light weight... the ¾ ton capacity model weighs only 13 pounds. Herc-Alloy flexible load chain. Labor saved more than repays initial low cost. Capacities: ¾, 1½, 3 and 6 tons.

LIFTS OR PULLS AT ANY ANGLE

YOUR LOCAL CM DISTRIBUTOR carries the CM Cyclone and the CM Puller in stock. Phone him for a demonstration in your plant.

CHISHOLM-MOORE

HOIST CORPORATION

Affiliated with Columbus-McKinnon Chain Corporation

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

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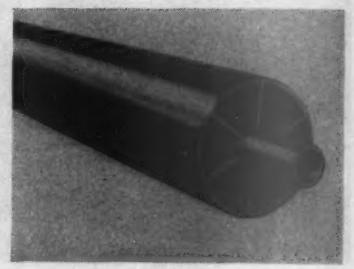
Begins on page 144

VALVES, PIPING & ACCESSORIES



Two-Fluid-Pass Heat Transfer Surface

The concentric chambers of this heat transfer surface are joined by radial fins for maximum heat transfer efficiency. Modine CRF tubing was originally designed for low-temperature, high-pressure applications. But it is suggested for a variety of installations, including process heating, condensing, and exhaust heat recovery.

Modine fabricates the tubing from copper, steel, stainless steel, nickel, and other metals. It comes in lengths up to 20 ft. They have achieved intimate contact of fin and tube elements by fusion bonding.

You can use simple "T" fittings for easy connection to both passes, and can arrange rows of tubing in series-parallel banks. The 6-fin type comes in diameters of 1-in. and 1⅜-in. But the maker will modify tube geometry to suit special requirements.

Modine Mfg. Co., 1300 De Koven Ave., Racine, Wis.

Check Valve for Low-Pressure Lines

Cracking pressure on this sensitive check valve is 4 to 8 inches of water. It's designed for low-pressure pneumatic and gas systems, where you want a valve that will open at the first whiff of pressure. Though the valve is highly sensitive, the maker claims it stays bubble-tight against any back pressure within its rated range of 0-100 psi.

James-Pond-Clark, East Green & Chester St., Pasadena, Calif.

More on page 354

HYSTER DEALERS *Everywhere*

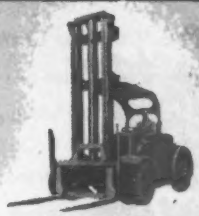
SELL AND SERVICE THE MOST COMPLETE LINE OF INDUSTRIAL TRUCKS ON THE MARKET

HYSTER
LIFT TRUCKS
STRADDLE TRUCKS
MOBILE CRANE

HYSTER 20
Capacity — 2000 pounds
Width — 37 inches
Length — 71 inches (less forks)

HYSTER 40
Capacity — 4000 pounds
Width — 42 inches
Length — 86 inches (less forks)

HYSTER 75
Capacity — 7500 pounds
Width — 60 inches
Length — 117½ inches (less forks)



HYSTER 150
Capacity — 15,000 pounds
Width — 86 inches
Length — 148 inches (less forks)

M STRADDLE TRUCK
Capacity — 18,000 pounds
Width — 78½ in. and 90½ in.
Length — 176 inches

MH STRADDLE TRUCK
Capacity — 30,000 pounds
Width — 90 in. and 100 in.
Length — 190½ inches

HARRY KRANE
Capacity — 10,000 pounds
Width — 75 inches
Length — 152 inches

...and now
HYSTER
Salsbury
Turret
Trucks

PALLET TRUCK
Capacity — 4000 pounds
Width — 35 inches
Length — 86 in. and 110 in.
Height — 55 inches

TUG
Towing capacity — 20,000 pounds
Width — 42 inches
Length — 62 inches
Height — 50 inches

PLATFORM TRUCK
Capacity — 4000 pounds
Width — 35 inches
Length — 97 in. and 115 in.
Height — 50 inches

CARGO TRUCK
Capacity — 4800 pounds
Width — 42 inches
Length — 103½ inches
Height — 58 inches

AUTO-LOADER
Width — 20 inches
Length — 135 inches
Height — 50 inches

Hyster dealers are located in 40 principal U. S. cities, and in 57 foreign countries. These men and their organizations sell — and more important — service the most complete line of industrial lift trucks, attachments and accessories, on the market today.

Phone your Hyster dealer for demonstration and list of owners. Or use the coupon for literature.

HYSTER® COMPANY

THREE FACTORIES

2956 N. E. CLACKAMAS, PORTLAND 8, OREGON
1856 NORTH ADAMS ST., PEORIA 1, ILLINOIS
1056 MEYERS STREET... DANVILLE, ILLINOIS

HYSTER COMPANY, 2956 N. E. CLACKAMAS, PORTLAND 8, OREGON

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☐ M ☐ MH ☐ KK ☐ Turret

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MY NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Take a "tall bite" out of

bring them down with these

V-Belts by

high power costs!

DAYTON COG-BELT* "teeth!"

✓ 40% MORE H. P. PER BELT ✓ FEWER BELTS

✓ FEWER PULLEY GROOVES ✓ LONGER BELT LIFE

Want to save 2 V-Belts on every 7-belt drive, more on bigger drives? You can with the premium Dayton Cog-Belt because each belt delivers 40% more horsepower, as 5 Cogs do the work of 7 ordinary V-Belts!

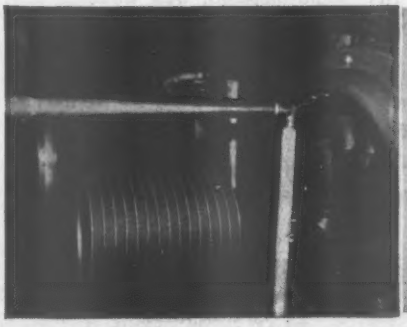
The reason: Cogs are the only V-Belt scientifically built to bend like your finger, for easy flexing, as the belt arches round pulleys. Compression strains are minimized, gripping power is increased. Cogs run cooler and last longer.

Want to save space? Cog-Belts let you use shorter center-to-center pulley distances—as much as 25% shorter.

Want to forget about V-Belts for the duration? Then convert to Cogs and their "40% Plus" performance, while you can. Give your Dayton Distributor the "high sign" of better power transmission—the arched finger that means Cog-Belt savings.

*T. M.

DAYTON RUBBER COMPANY • DAYTON 1, OHIO



COGS JOG GENERATOR!

A company making cheese boxes drives its plant generator with a 200 H.P. steam engine. The old flat-belt, countershaft drive never delivered enough h.p. to get maximum output from the generator. The Dayton Distributor sold them on converting to a Cog-Belt V-flat drive, direct to the generator. Now, the new drive delivers *more* h.p., at *slower* engine speed, with *less* fuel consumption, and—gets *maximum output* from the generator!

Dayton Rubber

WORLD'S LARGEST MANUFACTURER OF V-BELTS

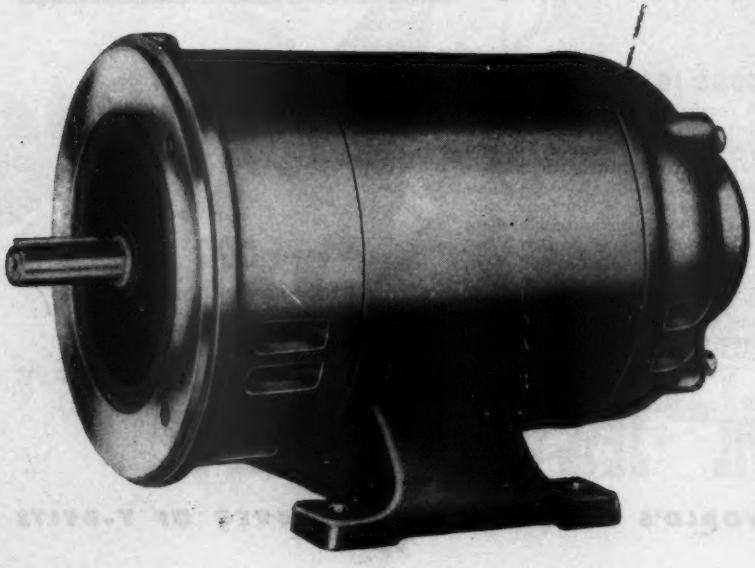
Now's the time to have gimlet eyes... and

Hoover®

ELECTRIC MOTORS

Nowadays with production goals going up, a factory has to keep really humming to make its quota! And if your job is to buy production equipment of any kind, you have to look mighty sharp to get equipment that will run reliably through thick and thin.

That's why so many plant managers and purchasing agents specify Hoover Motors on original equipment—or buy Hoover Motors as replacements. When you're spending your company's money on motors, remember Hoover is the motor with the reputation for safeguarding other people's reputations.



First there are CAPACITOR-START MOTORS for hard-starting, continuous-duty applications such as compressors, machine tools and pumps. Rigid or resilient mounted, sleeve or ball bearing, ¼ through 1 HP. Rigid-mounted, ball bearing only, through 3 HP.

Then there are POLYPHASE MOTORS for use where three-phase supply lines are available. Start without reduced voltage compensator. Low-cost operation. Rigid resilient mounted, sleeve or ball bearing, ¼ through 1 HP. Rigid-mounted, ball bearing only, through 5 HP.

Besides these general-purpose motors, there are other Hoover Motors—like the new NEMA "C" Face integral HP motor illustrated—designed especially for pumps, oil burners, fans and blowers. Write for details!

THE HOOVER COMPANY
Kingston-Conley Division
68 Brook Avenue
North Plainfield, New Jersey

whether you manufacture

buttons or bulldozers . . .

here's a good man to know!

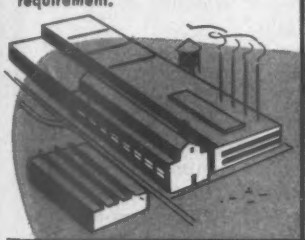
your Carey Industrial Sales Engineer

Trained to solve your building construction and maintenance problems . . . boost efficiency of your processing and manufacturing operations

Daily experience with diversified problems in construction and maintenance of buildings . . . as well as manufacturing and process operations . . . keeps this man's skills razor sharp. Use these skills to cut the fat from *your* building construction and maintenance costs . . . to whittle down operating expense!

Let your Carey Industrial Sales Engineer tell you how these and many other Carey industrial products can help you save money, cut costs!

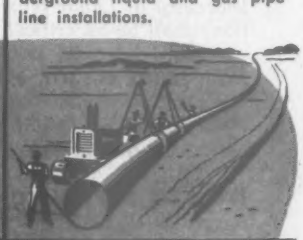
Built-up Roofing—for every industrial and commercial roofing requirement.

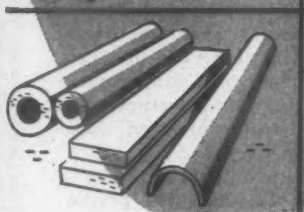


Car Cement for coating interior and exterior metal surfaces and joints. Seals out dirt, moisture. Prevents rust.

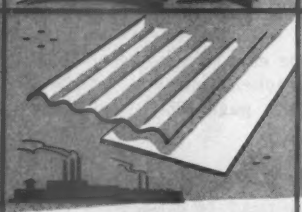
Asbesto-Sorb — thirsty fibers of asbestos that soak up oil, water, chemicals, to help maintain safety underfoot.

Pipe Line Felt — prevents corrosion and breakdown of vital underground liquid and gas pipe line installations.

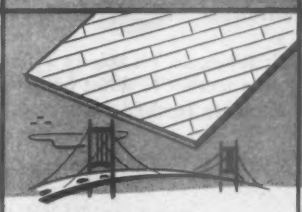




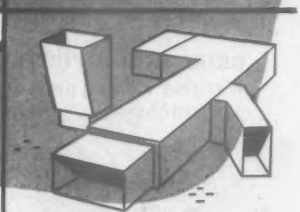
Super-Light 85% Magnesia Insulation—To prevent loss of heat energy in power plants, processing, manufacturing and plant heating operations.



Careystone Asbestos-Cement—a versatile roofing and siding material available in flat or corrugated form; resists fire, weather, corrosive chemicals.



Asphalt Plank—tough, boardlike, with a mineral surface that defies wear, prevents skids. Widely used for bridge and industrial flooring applications.



Careyduct—non-corrosive asbestos-cement duct to keep buildings breathing easy.

From the House of Carey—Serving Industry Since 1873

Write for the name and address of the Carey Industrial Sales Engineer in your locality!

Carey.

The Philip Carey Mfg. Company, Lockland, Cincinnati 15, Ohio
In Canada: The Philip Carey Co., Ltd., Montreal 25, P.Q

SIGNIFICANT LABOR DEVELOPMENTS

. . . told in brief for busy factory executives

By **PAUL A. KING**, *Assistant to Vice President for Personnel, Bigelow-Sanford Carpet Company, Inc. Member, New York Bar.*

NEW DEAL ON NLRB APPEALS. *Courts have been reluctant to upset NLRB decisions. Paid little attention to conflicting evidence. Now the Supreme Court warns: Look at all the facts*.....**page 200**

UNION CONTRACT HAS OVERTIME LUNCH MENU. *You won't often find a menu in a union contract. But there's a good reason for this one*.....**page 200**

HOW TO AVOID DISCRIMINATION CHARGES IN HIRING. *You can get help from New York State's 130-page booklet telling how its significant cases were treated*.....**page 202**

WHEN CAN YOU REHIRE A WORKER FIRED FOR NOT PAYING DUES? *If you rehire the culprit right away you break the law. If you wait too long, you are blacklisting the employee. NLRB trial examiner gives his solution*.....**page 202**

NEW STANDARDS FOR "CRITICAL LIST" OCCUPATIONS. *Secretary of Labor tells new rules for determining which occupations shall be on critical list*.....**page 204**

NO CLERICAL JOB FOR RETURNING SHOP VETERAN. *You don't have to take back a veteran merely because there is some work that he can do. So this production worker was denied a clerical job on his return*.....**page 206**

IT'S NOT UNFAIR TO INSIST ON ARBITRATION BAN. *Court overrules NLRB. Points out union would be just as unfair for insisting on not banning arbitration*.....**page 206**

BRIEF BUT IMPORTANT: *What do Ph.D.'s in science earn? . . . Working women need $41.40 a week. . . . What happens when union gets stubborn? . . . Social Security for baby sitters*.....**page 208**

New Deal on NLRB Appeals

The loser in a decision by the National Labor Relations Board is going to get a better shake when his case gets into the U. S. Circuit Court of Appeals for enforcement or review. The Supreme Court has just seen to this.

For years, going back to early Wagner Act days, plants on the losing side in NLRB cases have voiced a common complaint: The courts have been too reluctant to upset an NLRB decision if there was any "substantial" evidence at all to support it. Too often they have ignored evidence that was contradicting.

Many thought this complaint was answered when Congress passed the Administrative Procedures Act in 1946 and, a year later, the Taft-Hartley Act.

Since then, this question has been an issue in the circuit courts: Did Taft-Hartley broaden the scope of review by the courts?

The Sixth Circuit Court at Cincinnati answered "Yes" from the start. It has applied broader standards. Now it has Supreme Court backing. The Supreme Court stated the broader standards for the courts to follow in a decision involving *Universal Camera Corp. of New York.*

Major points the court makes:

- The standard of proof required of NLRB by the Taft-Hartley Act is no different from what the courts require of all federal agencies subject to the Administrative Procedures Act.
- In deciding whether evidence is "substantial," NLRB and the courts must "take into account whatever in the evidence detracts from its weight."
- Congress has disapproved of the favorable "atmosphere" and the "finality" which many courts, including the Supreme Court, have given to NLRB decisions.
- Courts must assume more responsibility for the "reasonableness and fairness" of NLRB decisions. They should "respect" the Board's findings. But at the same time they must set them aside when they cannot be justified "by a fair estimate of the worth of the testimony of witnesses or its informed judgment."
- A trial examiner's report is part of the evidence; the reviewing court must give it consideration.

Union Contract Has Overtime Lunch Menu

You won't often find a menu written into a union contract. But you'll find one in the agreement between the Niagara Falls plant of the Stauffer Chemical Company and District 50, United Mine Workers.

The clause says that "if an employee is required to work more than two hours beyond his regular

Why Wax Floors So Often?

"To protect the floors and simplify maintenance," would be a logical answer. However, these purposes can be served, and *still* the frequency of waxing can be reduced, by using *The Finnell Hot-Wax Process.* In this process, *Finnell-Kote Solid Wax* is used, and it is applied mechanically with *Finnell Equipment.*

Hot-waxing affords greater penetration—allows the wax to *flow* into the pores of the floor—and thoroughly utilizes the wax solids. *Hot-waxing with Finnell-Kote,* whose genuine wax content is three to four times greater than average wax, produces a finish unique in wearing and protective qualities. Shows substantial savings in labor costs, on a year-to-year basis, as a result of fewer applications required. *Finnell-Kote* is heated in a *Finnell-Kote Dispenser* attached to a *Finnell Machine.* The melted wax is fed to the floor through the center of the brush ring, and is uniformly and rapidly spread by the revolving brushes. *Sets in less than ten seconds,* and polishes to a beautiful, non-skid finish that actually *seals out* dirt and grime. Contains genuine Carnauba.

Finnell makes a complete line of *Waxes* . . . also a full line of *Cleansers* and *Sealers* . . . and *Floor-Maintenance Machines* and *Accessories* for every type of floor care. The machine shown below is a *600 Series Finnell* that can be used to apply wax, polish, wet-scrub, scrub rugs, steel-wool, dry-scrub, sand, and grind! Four sizes: 13, 15, 18, and 21-inch brush diameter.

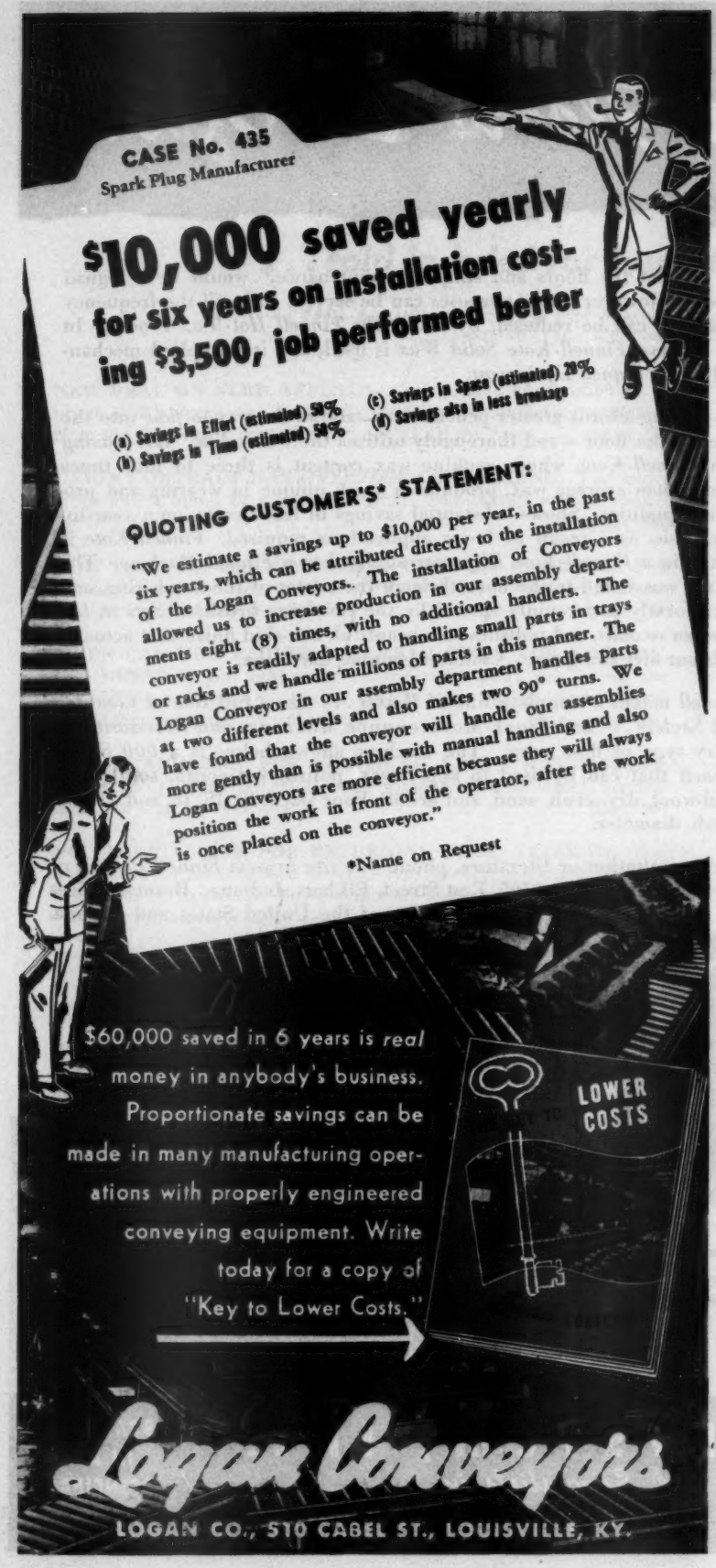
For consultation or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2505 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Pioneers and Specialists in

FLOOR-MAINTENANCE EQUIPMENT AND SUPPLIES

BRANCHES IN ALL PRINCIPAL CITIES


CASE No. 435
Spark Plug Manufacturer
$10,000 saved yearly for six years on installation costing $3,500, job performed better
(a) Savings in Effort (estimated) 50%
(b) Savings in Time (estimated) 50%
(c) Savings in Space (estimated) 20%
(d) Savings also in less breakage
QUOTING CUSTOMER'S* STATEMENT:
"We estimate a savings up to $10,000 per year, in the past six years, which can be attributed directly to the installation of the Logan Conveyors. The installation of Conveyors allowed us to increase production in our assembly departments eight (8) times, with no additional handlers. The conveyor is readily adapted to handling small parts in trays or racks and we handle millions of parts in this manner. The Logan Conveyor in our assembly department handles parts at two different levels and also makes two 90° turns. We have found that the conveyor will handle our assemblies more gently than is possible with manual handling and also Logan Conveyors are more efficient because they will always position the work in front of the operator, after the work is once placed on the conveyor."
*Name on Request
$60,000 saved in 6 years is real money in anybody's business. Proportionate savings can be made in many manufacturing operations with properly engineered conveying equipment. Write today for a copy of "Key to Lower Costs."
LOWER COSTS
Logan Conveyors
LOGAN CO., 510 CABEL ST., LOUISVILLE, KY.

SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 200

shift, [he] shall have adequate lunch consisting of 1 meat, 2 vegetables, dessert, and drink. [He] will be paid the sum of one dollar in lieu thereof."

How to Avoid Discrimination Charges in Hiring

State anti-discrimination laws are pretty general. So the best way to find out what you can do or say in getting or questioning job applicants is to look into specific cases handled by the state commissions.

Another reason for looking into such cases is to see what exceptions are being made because of new situations.

You can see how the law works in New York by looking at the 1950 report of the New York Commission Against Discrimination—just released. New York is a key state in anti-discrimination legislation. The rulings of its commission may be followed in other states.

Here's an example of what you'll find: This phraseology in a help-wanted ad was declared unlawful: "Wanted, out-of-town college graduate." The commission found that it discriminated against graduates of New York City colleges, who include a large proportion of Jews, Negroes, and Catholics.

And here are two situations for which exceptions were made:

Pension plans. For purposes of pension plans the name of the applicant's father and mother, husband or wife, and minor dependent children may be asked. Also their addresses (within the U. S.).

National Security — Inquiries made under the direction of a federal agency whose functions include national security are permitted if a certificate is secured from the agency.

When Can You Rehire a Worker Fired for Not Paying Dues?

Nonpayment of dues is a union problem that can become a management problem too—particularly in these days of labor shortages.

More on next page

HOW DID THIS QUARRY INCREASE CRUSHER BEARING LIFE 600%?

An example that shows how National Bearing Division Nickel Babbitt has reduced costs

Thirteen years ago National Bearing Division relined a crusher bearing for a Midwest quarry with N-B-M Nickel Babbitt. This babbitt alloy has exceptionally high resistance to crushing, creeping and spreading, thanks to a special method of blending developed by N-B-M Research. The method had complete follow-through in modern plants where skilled men exercise close control over every step of the foundry operation.

Result? The ordinary life expectancy of such bearings is 2 years. This bearing is still giving perfect service today — 13 years later! And it crushes hard grade rock an average of 8 hours a day, 277 days a year!

This is tremendous operating economy—and it's the direct result of a chain of action that began with National Bearing Research, coupled with N-B-M Engineering and Production skills. Add to these our strategic plant locations in major industrial centers and you have a team operation that repeats this kind of money-saving procedure throughout industry.

It's another example of how we are constantly finding new ways to lower costs and improve performance of these products used by our customers . . .

Non-Ferrous Bearings and Castings—
As-Cast or Machined

Bronze Bars—
As-Cast or Machined;
Cored, Solid, Hexagon

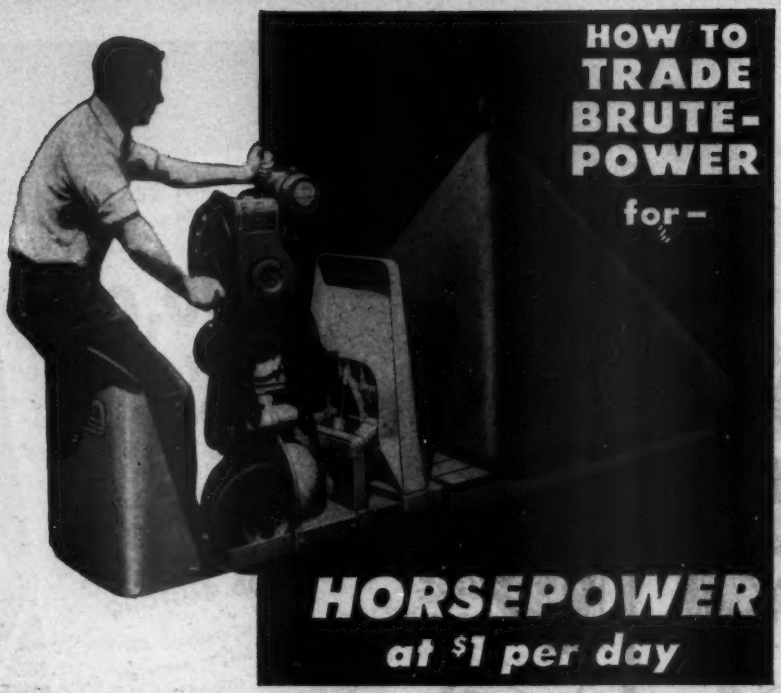
Babbitt Metals—
For every type of bearing service

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

4928 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

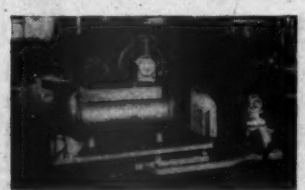


Here's how you can install modern lift-truck handling methods in your plant—and your fuel cost may be less than $1 per 2-shift day. The versatile Truck-Man's rugged gasoline power, hydraulic lift and maneuverability fit it into plants and warehouses of all types and sizes. Here's how Truck-Man can save your money and manpower:

IF YOU'RE SMALL — Truck-Man Skid Lift, Pallet Toter or Platform Utility move loads now handled by two or three men with "push-pull" trucks or hand-led powered "jacks," limited to the pace of the operator.

IF YOU'RE GROWING — The Truck-Man Pallet Toter is economical for picking up distant palletized loads and laying 'em down for your heavier, costlier "stacker." Use Model D if you work with skids.

IF YOU'RE BIG — Plants covering acres use fleets of Truck-Man Pallet Toters as inter-plant "feeders"— increase the efficiency of their big fuel-and-power-consuming stackers by restricting travel to small areas. The Skid Lift easily handles 3500 lb. skid and bin loads, loading directly on trucks and cars.



Model DT Platform Utility—2000 lb. Capacity

Model D Skid Lift—3500 lb. Capacity

TRUCK-MAN GIVES YOU—

• Low cost, easy maintenance, a minimum of fuel and labor • Maneuverability in crowded aisles, 360° steering, 27" width • Simple, sure handling with driver always facing load and his "spot" • Pneumatic-tired drive wheels for fragile loads, wooden floors, reduced driver fatigue • Dash pot throttle controls for soft starting; two speeds forward and reverse; speeds from a creep to 8 mph • Efficient load to weight ratio of almost 4 to 1, easy on elevators, ramps, car and truck floors • Rugged design — built for 'round-the-clock, man-saving work!

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SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 200

Under the labor relations law a union can insist on the discharge of a nondues-payer. Suppose it does insist? And suppose the company fires the delinquent worker. When can the company rehire him?

An NLRB trial examiner recently ruled: not before the end of the contract term. However, he also said that the period depends upon the circumstances:

"Under some circumstances, such as a discharge at the end of a contract period, immediately succeeded by a renewal of the same contract, perhaps other provisions ought to be made. For the determination of the instant problem, however, the contract period provides an adequate solution."

Suppose the employer rehires the worker after the period indicated by the examiner, does the union have to reinstate the worker to membership? The trial examiner wasn't absolutely clear about it as a general matter. But the answer at least in this one case was that the union does *not* have to reinstate the worker. (*Standard Brands*)

New Standards for Critical List Occupations

Last August, Secretary of Labor Tobin issued a list of critical occupations. The armed forces use this list as a guide to deferment of members of reserve units. It is also circulated among draft boards.

The Labor Department now announces new standards for adding occupations to the list in the future. A new occupation will be added to the critical list:

If under the foreseeable mobilization program an over-all shortage of workers in the occupation exists or is developing which will significantly interfere with the effective functioning of essential industries and activities.

If a minimum accelerated training time of two years (or the equivalent in work experience) is necessary to the satisfactory performance of the occupation.

If the occupation is indispensable to the functioning of the industries or activities in which it occurs.

More on next page

When You Buy Blackhawk Jacks, You

GET ALL THIS

PATENTED DOUBLE PUMP

— all in ONE unit! A big feature of 30-ton and 50-ton models. Speed pump provides fast load contact—power pump cuts in automatically! No shifting of handle or double-yoking as with separate pumps.

ALL-DIRECTIONAL OPERATION

— Full power and travel at any angle, vertical to horizontal. Handle is side-rest for horizontal use.

EXTRA UTILITY

—A gauge can mount in the base to show pressure exerted — for measuring or testing jobs.

EXTRA SAFETY

— The pump beam is protected by the handle and base. The pump is protectively hidden in the super-strong base which is machined from a single piece of steel.

30-TON
Model FB-11
Weighs only 76 lbs.

50-TON
Model GB-11
Weighs only 111 lbs.

100-TON
Model N-12
Weighs only 183 lbs.

These three, *jug-sized* power houses are part of the world's most complete line of Hydraulic Jack Equipment. Whether you choose a 1½-ton or 100-ton Blackhawk — you'll get exclusive features and longer jack-life. Every model is *one-man* operated! Write for catalogs. Order from your supply house.

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MOVE MATERIALS faster with fewer workers

An excellent way to cope with the dwindling labor supply is to use conveyors to aid workers in moving materials. All man hours thus saved can then be used on productive operations.

You have available a complete line of MHS Pre-engineered Conveyors for handling packages, parts between manufacturing processes, progressive assembly, inspection, order make-up and into or out of storage.

All component conveyor parts are simplified and standardized—mass produced for maximum manufacturing economy. They are capable of an unlimited number of combinations to meet any specific set of requirements. Thus you may have the advantages of a custom-built conveyor without the engineering expense or without any delay for designing.

Write for Bulletin PE 1 on MHS Pre-engineered Conveyors

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SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 200

No Clerical Job for Returning Shop Veteran

The law says you have to restore a veteran to his former position or to a position of like seniority, status, and pay unless your circumstances have so changed "as to make it impossible or unreasonable to do so." Does this mean you have to take a veteran back if you have *any* job he can do—even if it's clerical work, and he has formerly worked in the shop?

No, says a federal court, in a recent ruling. Here is the case:

Employee Weinman was a trucker when he left Colt's Hartford plant. When he came back the position didn't exist. In fact the entire payroll had been cut considerably. So Weinman was put on the recall list of laid-off workers, in line with his seniority. But Weinman demanded a clerical job that was available elsewhere in the company. The company refused, and he went to court.

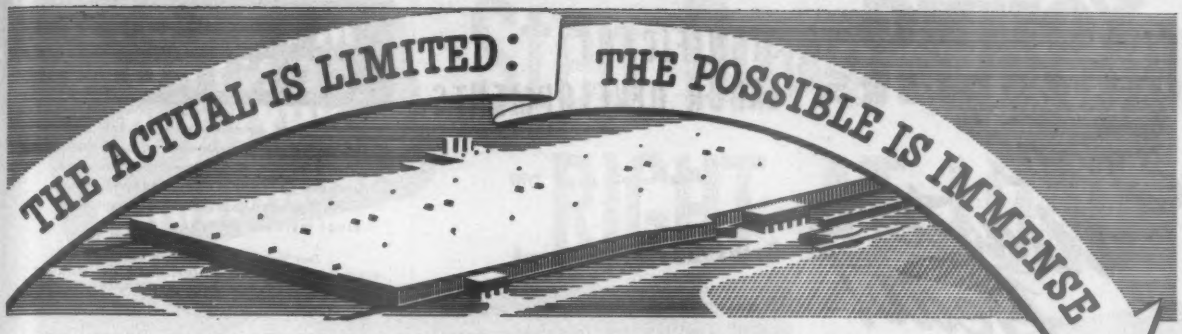
The U. S. District Court for New York which heard the case ruled that it was unreasonable to expect the company to yield to Weinman's demand. In the first place, Weinman's production job was unionized, and seniority was not company-wide. Secondly, the clerical jobs were of an entirely different seniority and pay status. Clerical workers were paid on a salary basis —not hourly. Greater care was used in selecting clerical workers. (*Weinman vs. Colt's*)

It's Not Unfair to Insist on Arbitration Ban

Suppose you refuse to sign a union contract unless it contains a management rights clause that forbids arbitration. Are you guilty of an unfair labor practice because you refuse to sign?

The NLRB said yes, you are guilty, when this question came up in a specific case. But the U. S. Court of Appeals in New Orleans says no. The court pointed out that the employer was no more guilty of an unfair labor practice in insisting on not having arbitration than the union was in insisting on it. (*American National Insurance*)

More on next page



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

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DESIGNS ORIGINEERED IN WELDED STEEL ARE ALWAYS LOWER IN COST

WITH welded construction, new product shapes can be created, utilizing the inherent low cost economies of steel. There is less cost per pound with steel. Fewer pounds are needed. Furthermore, each pound of metal can be applied where it will do the most good.

Convention-bound designs can be completely discarded. Welding enables the engineer to exercise his imagination . . . to create more efficient product shapes . . . to get better distribution of metal. He can use either standard rolled steel shapes or fabricate his own sections.

The "thought starter" sketches show how a typical section may be developed to save material and cut labor cost. Your Lincoln Welding Engineer will gladly demonstrate how these basic cost-saving principles of welded steel can be applied to your products. Simply write The Lincoln Electric Company, Cleveland 1, Ohio.

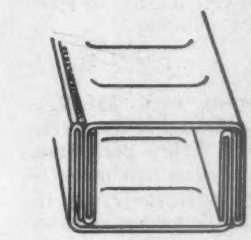

Fig. 6. Box section is fabricated from lighter gauge sheet than Figure 5. Flanges are folded metal to increase amount of material at outer edges. Web is corrugated to achieve maximum strength per pound. Weighs 5% less than Figure 5. Is Automatic Lincolnwelded for lowest fabrication cost.

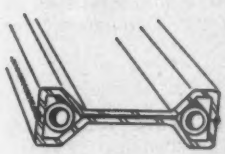

Fig. 5. Pressed steel section formed from light gauge metal. Die formed half sections are assembled over steel tubing and Automatic Lincolnwelded at outer edges. Weighs 80% less than Figure 1.

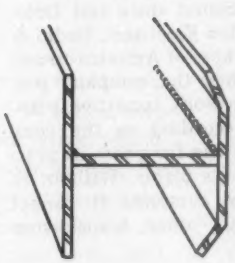

Fig. 4. Bottom flange of "I" section can be brake formed from light material and Automatic Lincolnwelded on one side only to web. Saves 10% metal and 50% fabricating cost over section shown in Figure 3.

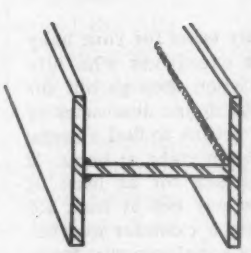

Fig. 3. "I" section. Higher strength to weight ratio under lower loading conditions is gained through better distribution of metal in outer areas. Needs 85% less metal than Figure 1 . . . 40% less metal than Figure 2.

the ACTUAL

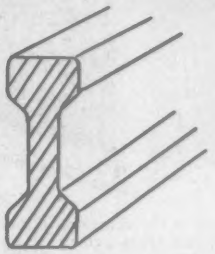

Fig. 1. Cross section through an iron cantilever beam designed to resist a bending moment.

increasing the YIELD

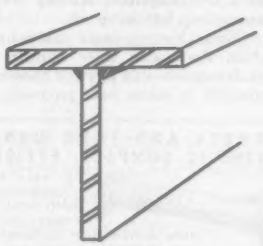

Fig. 2. Tee section through comparative beam fabricated by welded steel. Needs 75% less metal than Figure 1 to achieve equal strength in bending.

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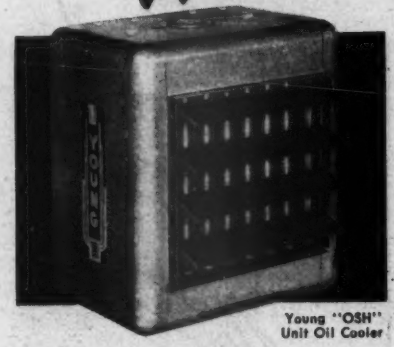

Young "OSH" Unit Oil Cooler

Here is the economical way to cool lube oil when water is at a premium or when waste heat can be used to warm room interiors. Young Unit Oil Coolers do double-duty . . . serve as heat exchangers and unit heaters.

Typical Young-quality design and construction include: a non-ferrous tube-and-fin core, one-piece cast iron headers, spring suspension of cooling core for free expansion and contraction, sturdy welded mounting brackets, etc.

These Young units cost no more than shell and tube bundle heat exchangers—can pay for themselves quickly in waste heat recovery.

SHELL AND TUBE BUNDLE LINE IS COMPACT, EFFICIENT

For your normal oil cooling requirements, you'll find Young shell and tube bundle heat exchangers are standardized for economy, precision-built for efficiency.

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☐ Send me your catalog No. 3550 on Unit Oil Coolers.

☐ Include Catalogs No. 1049 and 1149 on Shell and Tube Bundle Heat Exchangers.

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SIGNIFICANT LABOR DEVELOPMENTS

Begins on page 200

Brief But Important

What do Ph.D.'s of natural sciences earn? The United States Bureau of Labor Statistics says, a median salary of $7070 a year, if they are in private industry. The government pays them less—$6280. In education it is comparatively a labor of love, with a median of $4860.

Working women need $41.46 a week. A working woman living with her family in New York State in Sept. 1950 needed that much to support herself adequately, pay income tax, and save for emergencies and for old age. This figure was 6% higher than in Jan. 1950. These figures were secured by the Division of Research and Statistics of the New York Department of Labor.

What happens when union gets stubborn? The General Electric Company closed its recently modernized Oakland, Calif., transformer plant, strikebound since last October. The United Electrical, Radio & Machine Workers of America struck the plant when the company proposed a piecework incentive plan. The plan, according to the company, was in use for years in practically all of its plants. Without it, the company contends it cannot compete with other transformer makers.

Social Security taxes for your baby sitters. Plant executives who hire baby sitters when they go out for an evening to dodge the cares of the day may return to find a social security problem right at home. If a baby sitter sits for at least 24 days and you pay her at least $50 in cash during a calendar quarter, you must pay social security taxes. But here's the catch. Working after midnight constitutes a new day. So 13 days may become 26 days if you regularly stay out beyond midnight.

MERCOID CONTROLS

Designed to automatically regulate electrically operated equipment in accordance with changes in temperature, pressure, vacuum, fluid level or mechanical movement. Equipped exclusively with corrosion-proof mercury switches.

They Have What Experienced Engineers Want—
POSITIVE SAFETY • YEARS OF DEPENDABLE PERFORMANCE
EASE OF INSTALLATION • CONVENIENT ADJUSTMENTS

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CARTER Plunger Pumps

for better handling of your "problem" liquids

~~EMULSIFICATION~~ ~~CORROSION~~ ~~AGITATION~~

- chemical waste & slurries
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CARTER CARTER CARTER CARTER CARTER CARTER CARTER CARTER CARTER

Designed specifically for economical handling of solid-laden, viscous and mildly corrosive liquids — practically eliminating these 3 major pumping problems. Above are a few typical applications where Carter plunger pumps have been slashing costs for industry.

- **Gasoline or power-driven**
- **2 GPM to 400 GPM —at varying pressures**
- **16 sizes and types**

Write today for details
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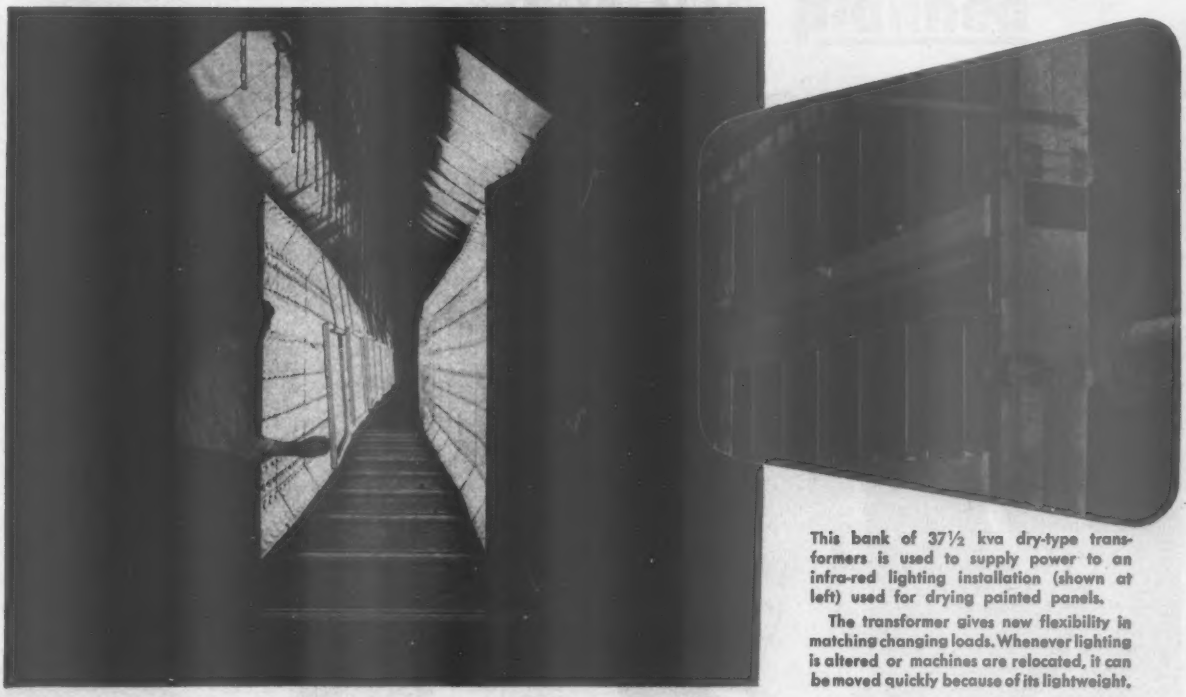
R. B. CARTER SALES INC.
Hackensack, New Jersey

ALLIS-CHALMERS
Dry-Type
Transformers

Step Down Voltage RIGHT AT LOAD



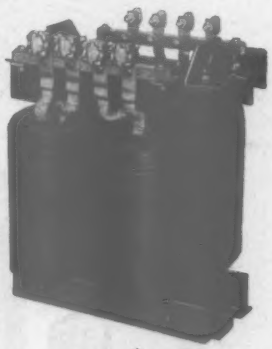
This bank of 37½ kva dry-type transformers is used to supply power to an infra-red lighting installation (shown at left) used for drying painted panels.

The transformer gives new flexibility in matching changing loads. Whenever lighting is altered or machines are relocated, it can be moved quickly because of its lightweight.

IN MEETING TODAY'S EMERGENCIES you may have to convert some of your plant operations almost overnight. This will mean rearranging plant layout, relocating machines, altering lighting and power services. For such conversions you'll find Allis-Chalmers dry-type transformers can be installed in a few minutes, thus preventing costly delays and bringing power close to the load.

"The most practical transformer I ever installed" is the way many an engineer has described the Allis-Chalmers dry-type transformer. These transformers are lightweight, small in size — they're built with heat resisting "Fiberglas" insulation. You can mount them on platforms, posts or on the machine itself. Solderless connectors on all popular sizes reduce hook-up time.

Spotting the transformer close to the load keeps secondary feeders short, helps you get full use of the power you buy. You will welcome savings in hard-to-get copper conductors and reduced power losses. The dry-type transformer helps you put rated voltage right up to the motors and lighting equipment — speeding up motor starting and improving voltage regulation. By operating motors, lights and other equipment at rated voltage you obtain more efficient performance.



Transformers are rated up to 300 kva, 600 volts and below. For more information about dependable Allis-Chalmers dry-type transformers, call your nearby Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3361

ALLIS-CHALMERS

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Pioneers in Power and Electrical Equipment from Generation through Utilization

YOU CAN BE **SURE**.. IF IT'S
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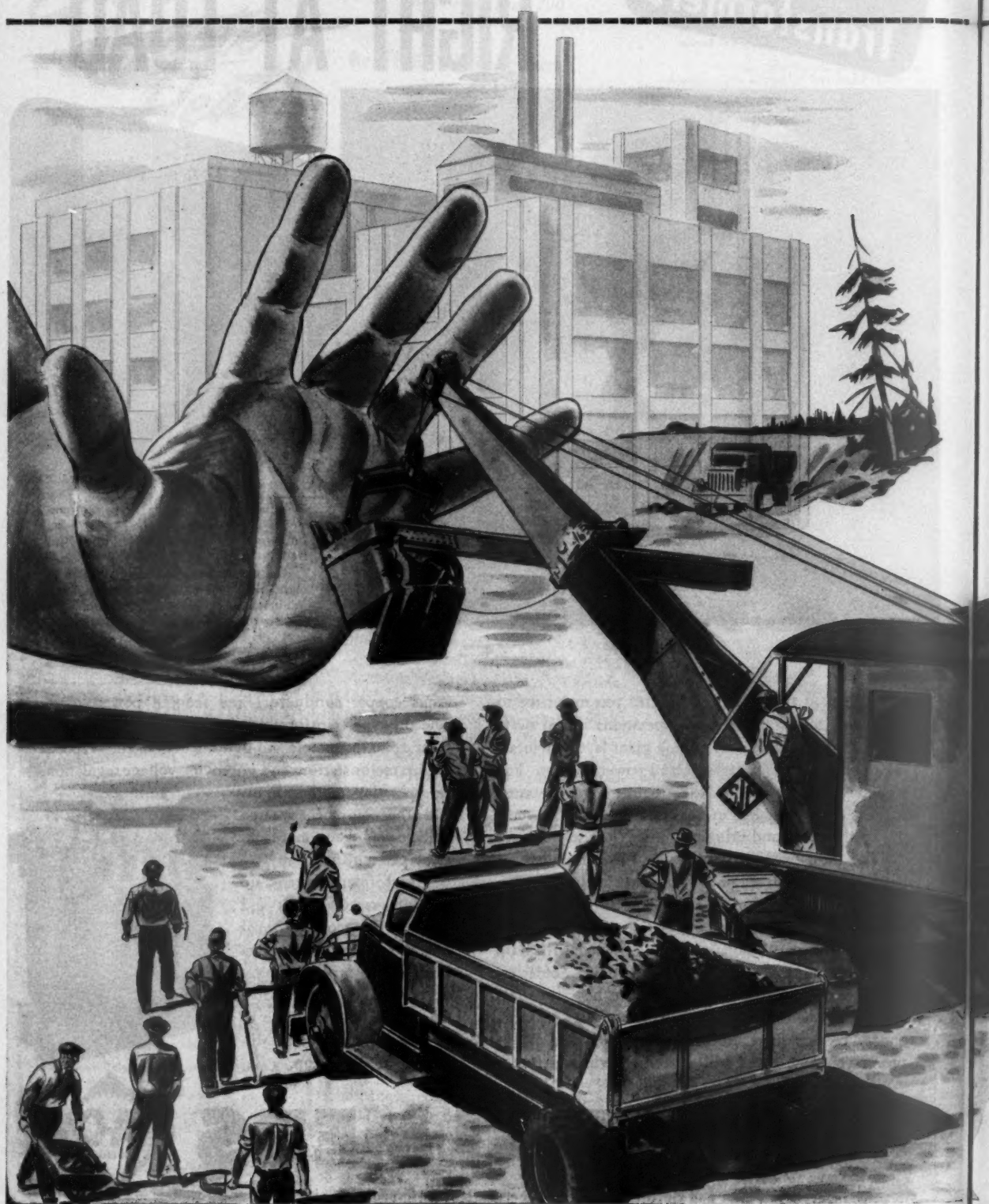

STOP!

...have you planned your power distribution system?

Building a new production area? Everything laid out to do the job you've planned? Sure it is.

"BUT . . . today's demands on production warrant the *best system*. One planned to *fully utilize scarce power;* one that *assures operational* safety; one that will take care of *future loads* and yet be flexible enough to handle shifting production lines.

"Whatever the problem—Westinghouse can help you find the 'one best system' for *your* plant.

"Westinghouse co-operation will help you find new and better answers to your distribution problems. The resultant planned distribution system will help make it possible for you to meet the demand for production today—tomorrow—and on into the future."

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Here's REAL help for your "System Planning"

1. A new 34-page booklet: "Industrial Plant Distribution Systems", B-4045. Fact-filled pages and colorful diagrams present the basic systems most widely used in Industry today. Find how to choose the *best system* for *your* plant.

2. System Selector: A wealth of information condensed to a pocket-size selector! In a matter of minutes you can make preliminary decisions on the system that answers *your* requirements.

3. Color Movie: Get all the facts visually! This 16-mm, full-color movie is a 20-minute dramatization that will point the way to new economies in plant power distribution. Ask one of our representatives for a free showing of "The Right Power Distribution System". No obligation, of course.

If you're expanding or building a new production area . . . get this invaluable information NOW!

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SYSTEM PLANNING SERVICE

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YOU MUSTN'T MISS—

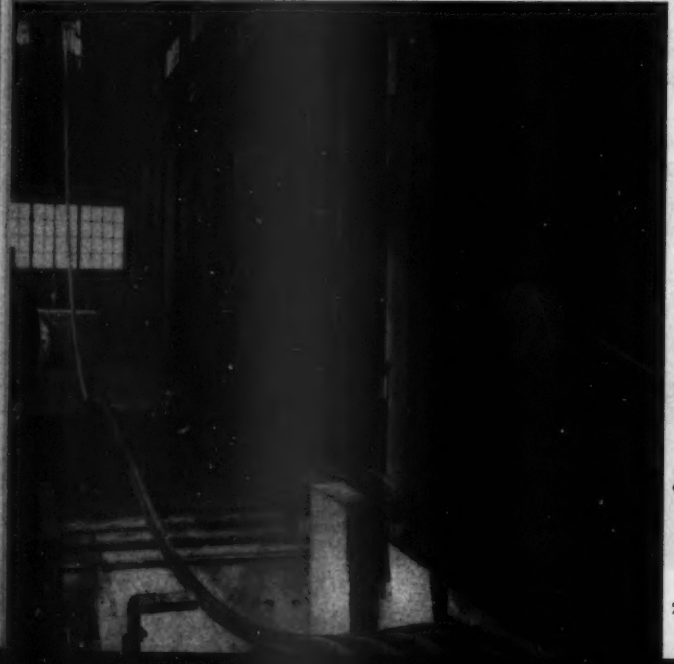
INDUSTRIAL NEWS, BEGINNING ON THIS PAGE

TIMELY HINTS TO BETTER MANAGEMENT ON PAGE 220

QUOTES FROM INDUSTRY'S LEADERS ON PAGE 224

IDEAS TO STIMULATE YOUR THINKING, ON EVERY PAGE

CABLE ON THE RAILS, 4400 feet to a car, is loaded at Okonite for 3000-mile trip. Loops run between cars.



CABLE IN THE PLANT at Paterson, N.J., runs from armoring machine to capstan, ready for loading.

INDUSTRIAL NEWS

7½-Mile Cable Fills Nine Gondola Cars

THE OKONITE COMPANY last month made what it believes is the largest shipment ever made of a single piece of equipment. It sent a 7½-mile-long electric cable across the country last month in one piece. It filled nine gondola cars—which were handled by five railroads during the journey. Okonite coiled 4400 feet of cable in each car, around a built-up wooden core. Vertical loops ran from car to car. Any separation of the cars would of course break the cable, so double sets of welded chain couplings were added to the regular couplings. The coupling pins were welded in a bracket to prevent dislodging.

Okonite shipped the cable from its Paterson, N.J., plant, where it spent five months constructing and testing it. Actually, Okonite began the original estimating, engineering work, and in-plant materials handling studies about three years ago.

The cable will carry Bonneville Dam power underwater to the San Juan Islands in Puget Sound off the State of Washington.

Interesting statistics: the submarine cable is 39,200 feet long, weighs about 750,000 pounds, is 4.6 inches in diameter. There are 1400 miles of copper wire in the electrical conductors; the cable is continuously armored by nearly 400 miles of quarter-inch steel wire.

More on next page

"Tycol Apreslube cuts bearing failure... keeps production going at top speed"

That's correct! Tycol Apreslubes are extreme pressure lubricants that stand up under severe heat and moisture conditions, under tremendous loads. They inhibit rusting, and are highly stable.

Tycol Apreslube means lower lubrication costs... longer equipment service life... and positive protection against excessive gear and bearing wear.

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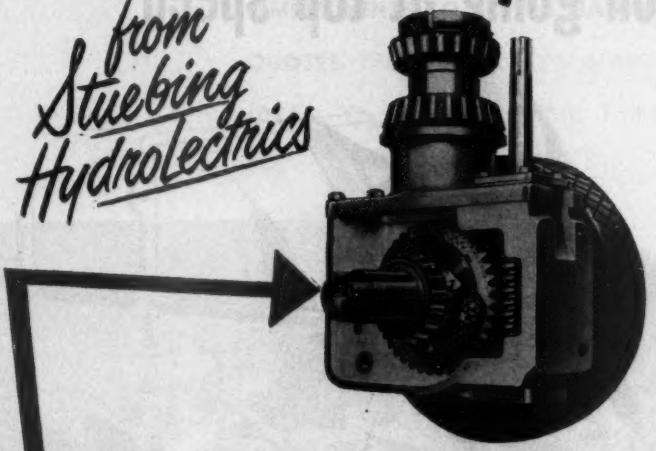
Here's why users get

"400% longer life"

from Stuebing Hydrolectrics



This sealed gear drive cuts 80% off maintenance and downtime!

Sealed in lubricant, this alloy-steel gear drive in the Stuebing Hydrolectric takes the place of old-style drive chains . . . actually gives Stuebing walkie trucks a drive comparable to modern automobiles.

Only Stuebing engineered Lift Trucks give you this sealed gear drive plus four-wheel stability, easy steering and twin front driving wheels.

From users came startling reports of increased service life up to "400% and more!" plus astounding savings on repairs and downtime. "No repairs . . . no downtime," reports one user. "No maintenance in a year and a half of heavy service," reports another.

You can have these same startling savings on walkie truck costs in your own plant, in addition, of course, to savings up to 80% on handling costs. Let us show you! Write for Bulletin A.

1071 STANDARD MODELS AVAILABLE

Lift Trucks Incorporated

2425 Spring Grove Avenue Cincinnati 14, Ohio

YOU MUSTN'T MISS—

Begins on page 212

One-Man, One-Machine Production Line

Shown above is one of the longest machine tools that's ever been built. It's 90 feet long—performs 104 operations on 86 pieces per hour. The Cross Company, Detroit, just delivered it to a large automotive supplier, for milling, drilling, and tapping transmission cases automatically.

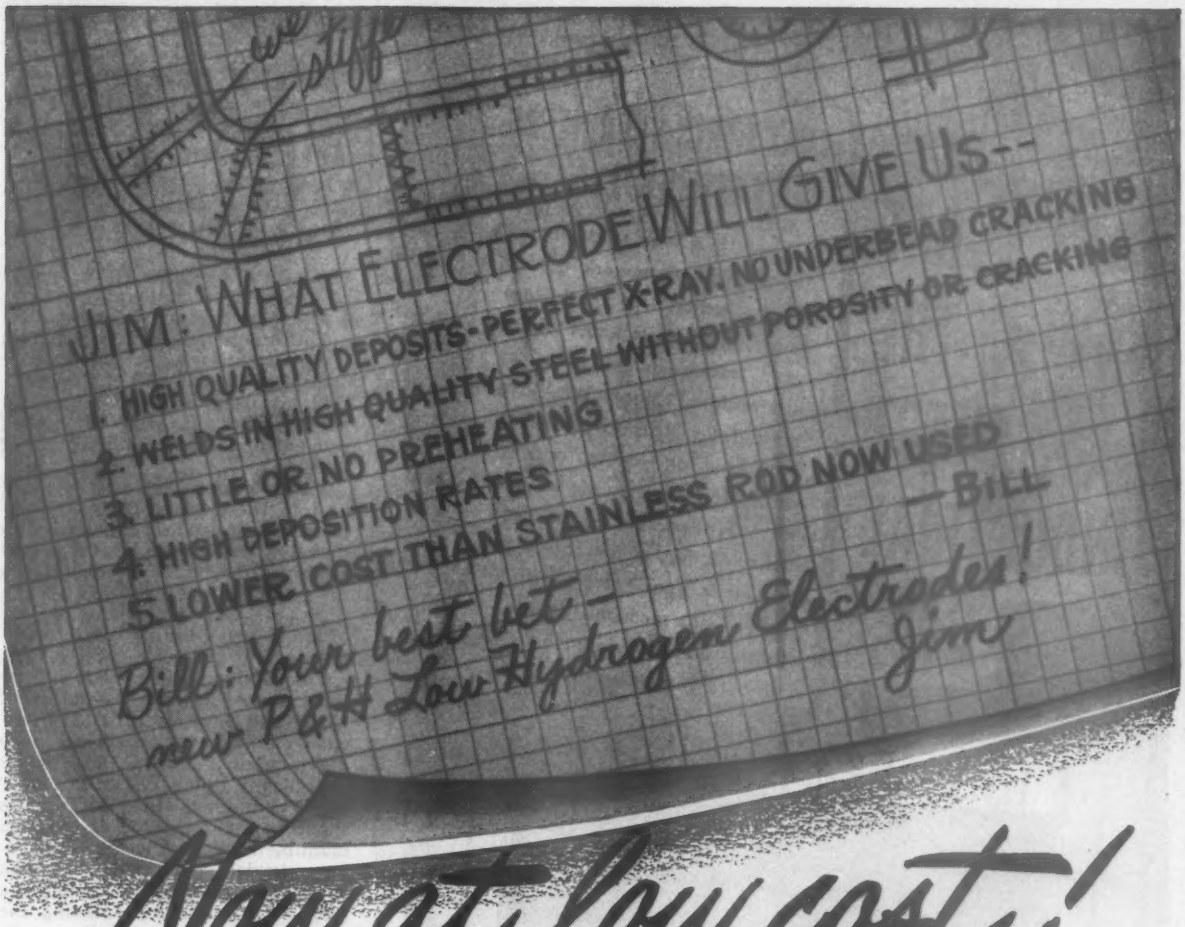
The new machine is equipped with automatic devices to transfer parts from station to station. And there are 54 stations—one loading, six milling, 23 drilling, reaming and counterboring, two tapping, 21 inspection, and one unloading. Only one unskilled operator is required to load and control the operations.

Another interesting feature — there's a built-in control unit which automatically stops the machine when any tool requires changing.

Aircraft Extrusion Die Pool Formed

What amounts to a nationwide pool of aircraft extrusion dies has been announced by the Supply Division, Air Materiel Command, USAF. The program's joint sponsors are the Air Force, the Navy, and the aluminum, magnesium, and aircraft associations.

Here's how the program works: A participating manufacturer will give up his exclusive rights to his extrusion dies. They'll be made available to all participating companies and government agencies that need them. The die user will


JIM: WHAT ELECTRODE WILL GIVE US--
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3. LITTLE OR NO PREHEATING
4. HIGH DEPOSITION RATES
5. LOWER COST THAN STAINLESS ROD NOW USED
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Now at low cost!

P&H LOW HYDROGEN ELECTRODES

For welds with superior physicals that match special steels, simplify production — —

Here's the world's most complete line of low hydrogen electrodes — 14 types to choose from.

Operators prefer them because of their easy manipulation, easy slag removal, smoother deposit, low spatter loss, fast deposit rate, good penetration, and less smoke.

Manufacturers prefer them too. They have fewer rejections. Smaller welds for faster production. Fewer types of rods to buy, stock, and supervise. They eliminate trouble with off-analysis steel.

Simplify your welding procedures. Standardize on P&H Low Hydrogen Electrodes. Your costs are lower, your welds better and stronger.

P&H HARNISCHFEGER CORPORATION

WELDING DIVISION
4525 W. National Ave.
Milwaukee 14, Wisconsin

2255

Here are a few of the money-saving P&H Low Hydrogen Electrodes:

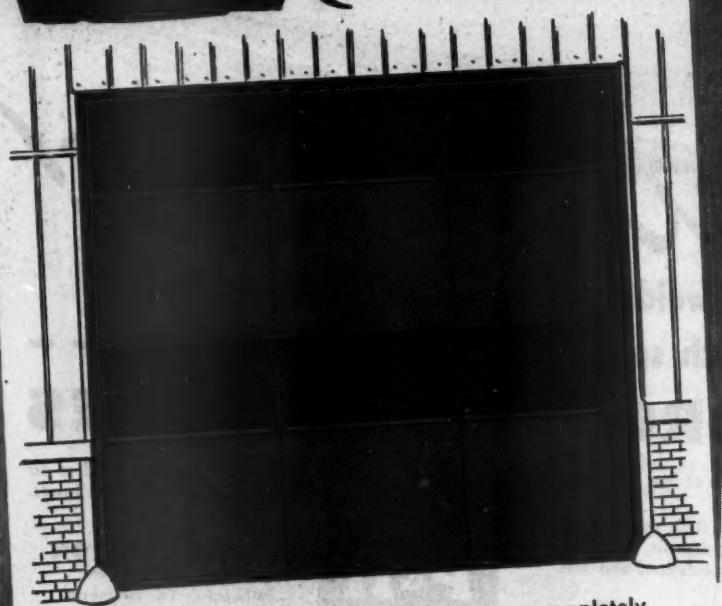
- *For problem steels:* High carbon, high sulphur, cold-rolled alloy . . . 70LA and 70LA-2.
- *For steel castings repair;* matches analysis and heat-treating properties of Grade B castings . . . P&H .25C.
- *For steel castings repair;* matches heat treating properties of Grade B castings . . . 70LB.
- *For welding nickel-alloy steels;* gives high impact resistance at low temperatures . . . 75LP.
- *For Chrome-moly steels* (1% Cr., ½% Mo.) used in power piping . . . 80LE.
- *For Chrome-moly steels* (2% Cr., 1% Mo.) used in power piping . . . 90LE.
- *To match heat-treating properties of SAE 1040* and like steels. Also for steel-castings repair . . . P&H .40C.
- *For welding high hardenable steels.* Also steel castings repair . . . AW2B.
- *For repair welding Grade C castings* and steels of similar composition . . . P&H-7.
- *Comparable to SAE 8630 steel* . . . excellent heat-treating and flame-hardening characteristics . . . 90LH-2.
- *For welding high hardenable steels* without pre-heat such as re-rolled rail stock . . . P&H-12 and P&H-17.
- *For aircraft and similar steels* . . . has wide range of properties under heat treatments . . . P&H-21.

Excavators • Overhead Cranes • Hoists • Arc Welders and Electrodes • Soil Stabilizers • Crawler and Truck Cranes • Diesel Engines
Cane Loaders • Pre-assembled Homes

GET THE EXACT INDUSTRIAL DOOR

THAT MEETS YOUR NEEDS MOST EFFICIENTLY!

There is a way to do it . . . to take all guesswork out of the selection of industrial doors. Just let us know about your requirements here at International Steel. We have been designing and producing entrances for business and industry for many years; we can be depended upon to take into consideration every factor involved in your entrance problem . . . to recommend a door that is exactly right . . . to produce it economically.



Multi-section vertical lift steel door . . . completely equipped for push-button opening and closing . . . designed and constructed for years of trouble-free service.

Get Authoritative Information on Heavy Industrial Entrance Problems . . . Write or Wire.

INTERNATIONAL STEEL COMPANY

1851 EDGAR STREET . EVANSVILLE 7, IND.

YOU MUSTN'T MISS—

Begins on page 212

maintain and replace all dies broken or worn out, as long as there is a foreseeable demand for them.

This interchangeability program is expected to result in much standardization of dies and of the specifications used in making government planes. It will, of course, prevent unnecessary duplication of dies.

Manufacturers are now submitting to the Supply Division complete lists of aircraft extrusion dies that they consider to be active. The Supply Division is screening lists to eliminate obsolete dies. When this screening is complete, the division will determine interchangeability, and publish a catalog.

The catalog will list: (1) all die shapes used in the assembly of USAF and Navy aircraft; (2) interchangeability; (3) cross-referenced die numbers; and (4) any necessary technical data. When this catalog is completed (the Air Force is shooting for Nov. 1), an aircraft manufacturer who needs a particular extruded shape need only look it up, find the die he needs, the name of the extruder owning the die, and the number of dies available. And thus he knows which extrusion producers are tooled up to produce the part he needs.

Tax Boosts Run Away From Profit Increases

Profits that corporations earned in 1950 were up one third from 1949. But the percentage increase in taxes that they paid makes the profit increases seem small indeed. And the faster earnings rose, the faster Uncle Sam's bill went up. Sample percentage figures, as given by the *Wall Street Journal:*

U. S. Steel's earnings rose 29%, its taxes 86%.

Du Pont's chemical earnings jumped 39%, its taxes 92%.

General Motors earned 27% more for stockholders, 109% more for the government.

Socony-Vacuum made 30% more profits, paid out 128% more in taxes.

General Electric's earnings rose 38%, its tax went up 152%.

Goodyear Tire scored a big 75% gain in earnings, Uncle Sam scored a bigger 172% gain in taxes.

All of the above companies except Socony-Vacuum paid more in taxes for 1950 than they earned for stockholders.

More on next page

"DURACUT ABRASIVE DISCS ARE TERRIFIC!"*

**This is typical of what hundreds of weld grinders and maintenance men are saying about these new flexible abrasive discs.*

For use on portable disc sanders, DuraCut abrasive discs are 1/8" thick while the ordinary coated discs have but a single layer of abrasive. The extra cutting ability offers these startling advantages:

- **Greater economy.**
- **Longer life — 15 to 20 times.**
- **Faster, sustained rate of cut.**
- **Safe — strong — resist tearing.**
- **Increased labor savings — less disc changing.**
- **Available in a wide range of grits, grades and structures — permit control over rate of cut and finish.**

TYPICAL APPLICATIONS: Blending and finishing of steel, stainless and alloy steel welds . . . Removing rust and scale . . . Finishing sheet metal jobs . . . Cleaning weld spatters.

Order Today for a Trial.

Sizes available for immediate shipment . . .
7 x 1/8 x 7/8 } In any of these
9 x 1/8 x 7/8 } grit sizes: 36, 54, 80

BAY STATE®

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal Cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ontario

Top Performance Consistently Duplicated

G-E ADJUSTABLE-SPEED DRIVE CUTS MILLING TIME BY 1/3

Exact speed set with finger-tip ease to meet varying job requirements

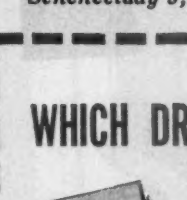
According to engineers of the Judson Steel Corporation, Oakland, Calif., a G-E Type ACA motor has reduced the time necessary to mill deformations on steel rolls by as much as 33%—and with less wear or damage to cutting heads.

The steel rolls are in turn used to process concrete reinforcing bars, and cuts vary in depth and number according to size of type of bars to be rolled. The ACA motor makes possible quick and accurate speed adjustment so that proper cutting speeds may be chosen to meet any specifications immediately. Higher speeds may be selected for smaller, shallow cuts—slower for deep cuts.

The ACA motor, one of G-E's adjustable-speed family, is helping manufacturers in every field to increase production with improved quality control, saving scarce materials, cutting rejects, and increasing versatility of existing machinery. There's a good chance that one or more of this versatile adjustable-speed drive family can do the same for you. Send the coupon below for complete details. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

Speed of the ACA motor driving this milling machine is quickly set by a twist of the nob on top to match machine speed to any given job.

WHICH DRIVES ARE BEST FOR YOU?



This 26-page manual will help you decide. It shows you how to go about selecting the *right* drive. The handy drive chart included is worth your detailed study. Bulletin GEA-5334. Check here. . . . . ☐

General Electric Company, Section F646-9
Apparatus Department, Schenectady 5, N. Y.

Please send me the bulletins checked:

☐ for reference only

☐ for planning an immediate project

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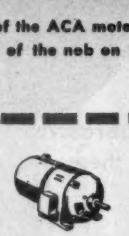
COMPANY _____

ADDRESS _____

CITY _____ STATE _____



THE ACA MOTOR—*Speed ranges to 20:1*—An adjustable-speed a-c motor. Speed range 3:1 or 4:1 continuous; for intermittent operation from 6:1 to 20:1. Bulletin GEA-4883. Check here. . . . . ☐

THE SPEED VARIATOR—*Speed ranges to 40:1*—An adjustable-voltage d-c drive that uses a-c power. Speed ranges 8:1 to 40:1 and beyond. Bulletin GEA-5335. Check here. . . . . ☐

THY-MO-TROL*—*Speed ranges to 100:1*—The most accurate, most versatile, and fastest acting of all G-E adjustable-speed drives. Speed ranges of 100:1 or better. Bulletin GEA-5337. Check here. . . . . ☐

ELECTRONIC SPEED VARIATOR—An electronically controlled version of the Speed Variator that offers most of the features of Thy-mo-trol for applications in the 15 to 60-hp range at moderate cost. Bulletin GEA-5336. Check here. . . . . ☐

** Thy-mo-trol is the General Electric Company's registered trademark for its electronic motor-control system.*

Headquarters for ELECTRICAL ADJUSTABLE-SPEED DRIVES

GENERAL ELECTRIC

646-9

YOU MUSTN'T MISS—

Begins on page 212

ECA Productivity Drive Benefits French Industry

France's productivity drive, sponsored by the Economic Cooperation Administration, is beginning to roll. Slow to start, France's program didn't kick off officially until last June, when a joint government-labor - management commission called the Comite Nationale de la Productivite was set up. Blueprint for the committee's action was a productivity program drawn up by the ECA in Washington.

Most attention so far has been directed to team visits. So far, 60 French teams totaling more than 700 experts have visited the U. S. to study American production methods. And more than 200 more teams are scheduled to come here within the next year or so. They'll represent every sector of the French economy.

But work has begun on other parts of the program. An American foundry expert and a machine industry expert have inspected those French industries and made suggestions for changes and improvements. Returning French teams have already made a start in increasing standardization, simplification, and specialization in their industries. A team of eight experts in this field will soon visit America to make further standardization surveys. Shipment of French products to the U. S. for analysis and recommendations for improvements is planned. A French shirtmaker recently sent his product to Washington under this plan; he received 14 suggestions for redesign and simplification of his shirt.

Other plans include:

(1) Display in France of U. S. products likely to give the French ideas for increasing productivity.

(2) Industry - by - industry comparison of production statistics.

(3) Preparation of digests of U. S. technical information.

(4) Vocational training.

(5) Consultation with U. S. experts on labor relations, union practices, safety measures, industrial health, and safety practices.

And there's an important by-product of this productivity drive. The ECA reports that it has created more good will for the U. S. among industry and labor groups in France, at the grass-roots level, than any other single U. S. official action.

More on next page

Give your buildings the advantages of

PC GLASS BLOCKS

THESE interior and exterior views of the new general storehouse building of the Norfolk and Western Railway Company, Roanoke, Virginia, show how effectively PC Glass Blocks can be utilized as part of the basic architectural scheme. Here, by adding vision-ventilation areas, the architect has pointed up the extreme flexibility of PC Glass Blocks in modern industrial design. *Architects: Smithey & Boynton, Roanoke, Va.*

▶ Through initial installations of PC Glass Blocks in new buildings, as well as extensive sash replacement programs, executives in all kinds of businesses have proved the many benefits and money-saving advantages inherent in these modern fenestration units. They've found that PC Glass Blocks help control temperature and humidity, increase production, improve product quality, cut maintenance costs, keep employees better satisfied. What's more, users report that PC Glass Block installations have actually paid for themselves with the savings they've eventually made possible.

It's easy to understand how PC Glass Blocks effect real economies. For example, they rarely need repairs or replacements. There is no periodic painting and puttying; no wood or metal sash to rot, decay, rust or corrode. And PC Glass Blocks have more than twice the insulating value of ordinary, single-glazed windows. This means a sizable saving in heating and air-conditioning expense.

Why not take advantage of all these benefits, and more, which are available to you when you install PC Glass Block panels? Our specialists will be glad to discuss your fenestration problems with you. Meanwhile, fill in and return the coupon (at right) for our free, informative booklet.

Pittsburgh Corning Corporation
Dept. P-51, 307 Fourth Avenue
Pittsburgh 22, Pa.

Without obligation on my part, please send me a FREE copy of your booklet, "The mark of a modern building—PC Glass Blocks."

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PITTSBURGH PC CORNING

GLASS BLOCKS

The mark of a modern building

Distributed by Pittsburgh Plate Glass Company; by W. P. Fuller & Co. on the Pacific Coast, and by Hobbs Glass Ltd. in Canada.

An informative discussion of dry chemical fire extinguishing agents with particular emphasis on factors responsible for quality and dependability. . . . . by

Arthur B. Guise
Chief Engineer
Fire Extinguisher Division
ANSUL CHEMICAL COMPANY

ANSUL DRY CHEMICAL

CONTROLLED QUALITY FOR CONSISTENT DEPENDABILITY

Your extinguishers can fail to operate when you need them most . . . or operate with less than maximum effectiveness and fail to extinguish the fire . . . unless properly maintained and charged with dependable first quality extinguishing agents.

This is equally true of dry chemical fire extinguishers. Ansul *"PLUS-FIFTY"* Dry Chemical is produced under carefully controlled conditions to meet specific requirements. *This means that every container of Ansul Dry Chemical has the same uniform high quality.* Ansul Extinguishers are designed for use with Ansul Dry Chemical only and, if consistent high fire extinguishing effectiveness is to be obtained, Ansul Dry Chemical should be used for recharge purposes.

There are a number of factors influencing dry chemical quality and all must be controlled because variations in a dry chemical can affect its fire extinguishing effectiveness.

PARTICLE SIZE. The sodium bicarbonate in Ansul Dry Chemical must pass tests to insure that the size of the particles falls into a certain range. If a certain percentage of the particles are over a maximum given size, the fire extinguishing effectiveness of the dry chemical is measurably decreased. Ansul's quality control procedures insure that the fire extinguishing effectiveness is always high.

MOISTURE REPELLENCY. The materials and methods used to produce water repellency in the finished dry chemical directly affect its flow and packing characteristics and electrical resistivity. All dry chemicals will absorb moisture when exposed to highly humid atmospheres. Excessive moisture absorption causes caking of dry chemical and resultant failure of the extinguisher to operate. Ansul Extinguishers and shipping containers for dry chemical are weather-proofed to minimize the possibility of moisture absorption . . . and Ansul provides a further safeguard by furnishing a dry chemical which *can absorb four times more moisture than ordinary dry chemicals* without harmful effects to any of its characteristics.

FLOW. Ansul Extinguishers are designed to discharge dry chemical at a definite rate. Quality control during the manufacturing operation insures that Ansul *"PLUS-FIFTY"* Dry Chemical will flow at a sufficiently high rate to insure maximum fire fighting effectiveness.

MODEL 20-B

PACKING. *All* finely divided solids tend to pack. Dry chemical is no exception. Daily tests of Ansul *"PLUS-FIFTY"* Dry Chemical as it is produced insure that every batch will fluidize readily. Proper design of Ansul Extinguishers doubly insures fluidizing of dry chemical and proper, effective, discharge.

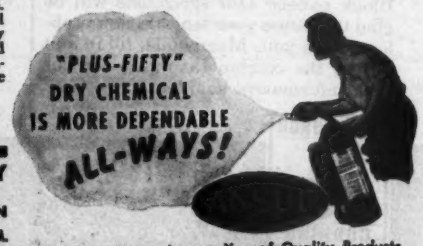
ELECTRICAL RESISTIVITY. Ansul *"PLUS-FIFTY"* Dry Chemical has an electrical resistivity of 1000 megohms. Frequent tests are made to insure that all Ansul Dry Chemical is equally resistive and always safe to use on electrical fires. Again, Ansul Dry Chemical can absorb four times more moisture than ordinary dry chemicals without impairing its electrical resistivity.

SUMMARY. Ansul's Engineering and Research Departments have developed specifications and tests to control particle size, moisture repellency, flow and packing characteristics. Last year 3500 flow tests were conducted on Ansul Dry Chemical to assure uniformly high quality of the manufactured product. You are assured of consistently high quality and maximum dependability with Ansul *"PLUS-FIFTY"* Dry Chemical.

Send for your copy of File No. 672. You will receive additional technical information on dry chemical. Also included is printed material describing Ansul's complete line of Dry Chemical Fire Extinguishing Equipment.

ANSUL
CHEMICAL COMPANY
Fire Extinguisher Division
MARINETTE, WISCONSIN

DISTRIBUTORS IN ALL PRINCIPAL CITIES IN THE U.S.A. CANADA AND OTHER COUNTRIES



This Name Assures You of Quality Products

YOU MUSTN'T MISS—

Begins on page 212

TIMELY HINTS

Sabotage Losses Insurable

Faced for the first time with a reasonable possibility of organized and widespread industrial sabotage, plant executives ask: "Can damage and loss resulting from sabotage be insured against?" The answer is *yes,* according to a special study undertaken by the National Association of Insurance Brokers.

Although no sabotage insurance is being written at this time, a combination of existing forms of insurance can be worked out which will provide substantial protection against loss or damage.

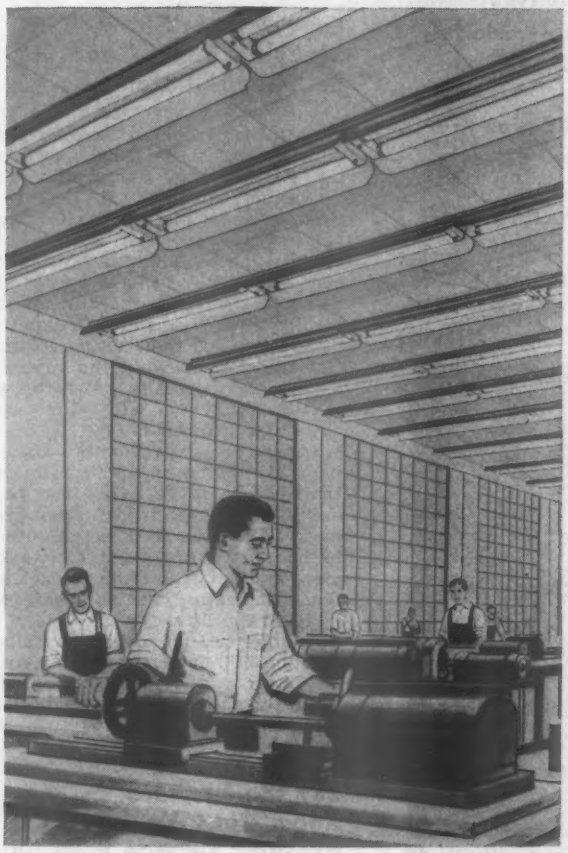
Briefly, the types of insurance needed would be: adequate fire insurance with extended coverage endorsement and endorsements covering malicious mischief, vandalism, and riot; explosion and machinery insurance, public liability, workmen's compensation, valuable papers insurance, and business interruption; all in combination with whatever other types of insurance are called for because of the nature of the particular plant being insured.

However, in the event of a declared war, where sabotage is ruled an act of war, loss from sabotage would be excluded under the war exclusion clause which is a part of most policies. The NAIB expects that provision for losses due to sabotage in this case will be written into government War Damage Insurance, currently under consideration in Washington.

Through cooperative research in steel company laboratories, the technical committees of the American Iron & Steel Institute have developed two new 'conservation' steels. By using boron, a noncritical element, these new alloys cut the use of chromium, molybdenum and nickel by about 50%. This is a far greater saving than was available with even the 'national emergency' alloys of World War II days. Both alloys will be available in a few weeks, the committees report.

More on next page

Is your Plant Lighting *Producing or Costing?*



With today's price controls and keen competition, it's vital to watch your profit margin closely. One important production tool . . . which can increase your output and improve the quality of your products . . . is proper lighting. Adequate illumination lets your employees work more efficiently . . . cuts spoilage . . . builds morale.

Remember the value of good light when you retool, rebuild or modernize your plant. Remember, too, that Day-Brite lighting fixtures are the best quality fixtures your money can buy. Carefully designed and ruggedly built, Day-Brite fixtures offer the years of trouble-free service, low-cost operation and maintenance that make them pay for themselves over and over again.

Day-Brite Lighting, Inc.,
5441 Bulwer Ave., St. Louis, Mo.

NOW, MORE THAN EVER—

AMERICA MUST SEE WHAT IT'S DOING

IT'S EASY TO SEE WHEN IT'S

135

all this IN ONE TRUCK

- 130" extreme lift
- 60" turning radius
- 59½" free lift
- Simple, *single cylinder*, low pressure hydraulic lift with cross suspension.
- Inclined automotive steering
- Foot pedal acceleration
- Convenient hoist and tilt controls
- Cushion or solid type tires
- Shockless center point steering
- Magnetic contactor travel control
- Unit power plant with double reduction gearing

Right angle stacking a 48" long pallet load in a 10 ft. aisle.

Be sure to investigate the new MERCURY JEEP Model-230 before deciding on any 2000 lb. capacity truck. Check its unusual versatility . . . its many operating improvements and you will agree the new Jeep is without equal for efficient low cost handling. Completely described in Bulletin 295. Write for your free copy.

MERCURY MANUFACTURING COMPANY
4110 S. Halsted Street, Chicago 9, Ill.

MERCURY Jeep
MODEL 230
2000 LB. CAPACITY

TRACTORS • TRAILERS • LIFT TRUCKS

YOU MUSTN'T MISS—

Begins on page 212

Experiments Show Machine Tools Can Be Speeded Up

Cutting tools can be made to move through steel at 16 miles per hour, according to tests made by the Rice Barton Corporation of Worcester, Mass. W. R. Coomey, general superintendent, speaking before the American Society of Tool Engineers, said industry hasn't even begun to reach the speeds at which metals can be machined with carbide tools. Rice Barton's experiments revealed that setting speeds and feeds far beyond the rate at which tools normally fail actually restores good tool life and cuts power requirements.

Supporting experimental examples: Milling cutter and workpiece remained cool at 1435 feet per minute, with .02 inches feed per tooth. When the feed was reduced to one tenth of this, both workpiece and cutter became too hot to touch, indicating that the decrease in speed tool life.

Another test: A planing machine consumed 92 horsepower when cutting steel at 100 feet per minute; when the speed was tripled, power consumption went down to 55 horsepower.

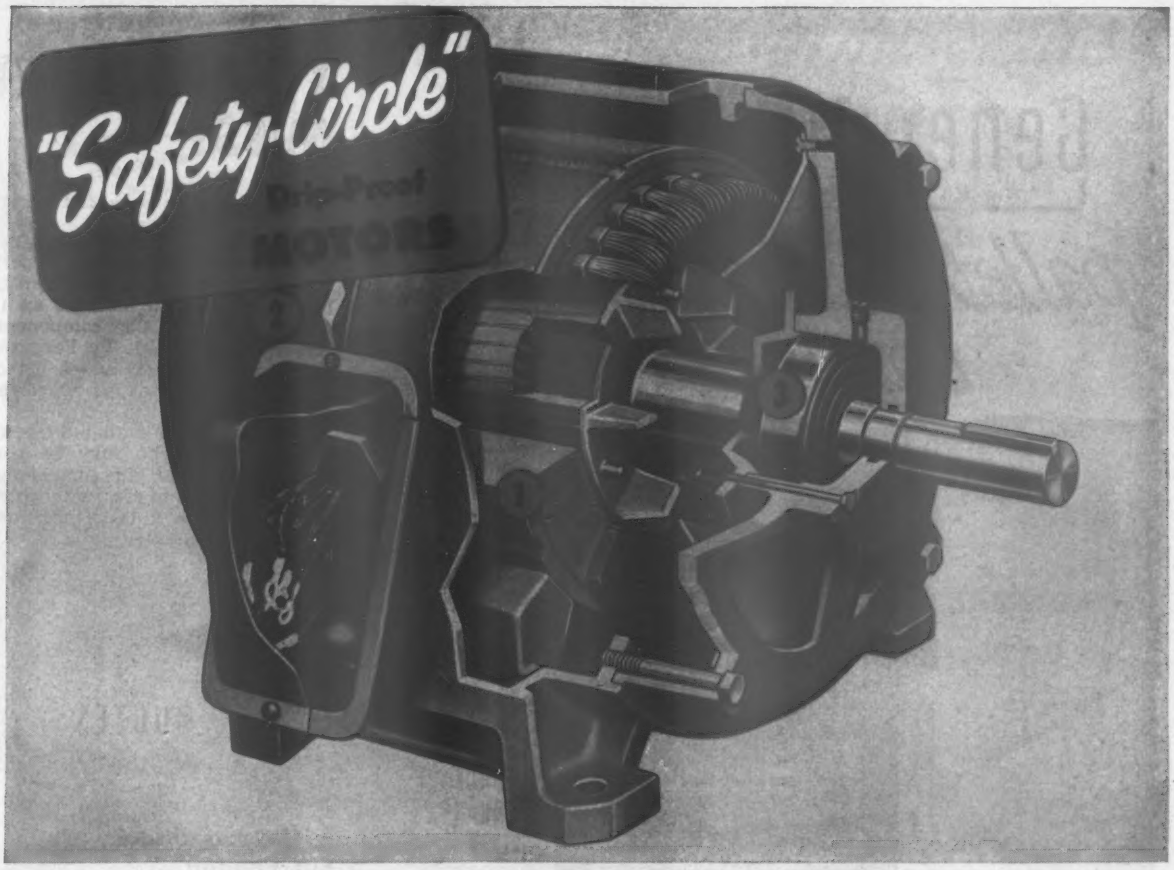
Let the "Primes" Know That You're at Their Service

Several alert companies are doing a new type of selling these days. They're seeking subcontracts (or prime contracts) on defense work. What they have to sell is their know-how and the capacity of their manufacturing plants. A few have put out attractive, interesting booklets to tell the government and prime contractors what they have available in the way of facilities.

One of these is the J. L. Ferguson Company, packaging machinery manufacturer, Joliet, Ill. It has published an 8-page brochure entitled *At Your Service.*

Under the head, "We have the men, equipment, know-how . . . ," is a brief history of the company, plus pictures and thumb-nail sketches of the executives.

Most important is the complete listing of the company's available production facilities. It includes the type, capacity, and make of lathes, grinders, metal saws, milling machines, drills, gear cutters, and



Safety-Circle Motors Give You Extra Protection 3 Vital Ways

1 Protection Against Electrical Breakdown — Stator punchings of low-loss electrical steel are welded together to form a rigid base for the windings. Complete stator is multiple dipped in special insulating varnish and baked after each dip. Special cambric insulation is placed in coil ends between phases to provide further protection against electrical breakdown.

2 Protection Against Physical Damage — Cast iron frame completely enclosing working parts on all sides rigidly maintains alignment and protects motor against blows, falling objects and other physical damage. Cast iron inherently resists corrosion better than other metals used for similar purposes.

3 Protection Against High Maintenance Costs — Bearings are pre-lubricated at the factory and should need no attention for long periods. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are provided.

NOW, when costs are high and skilled labor is becoming scarce, you need these extra protection features that only *Safety-Circle* Motors give. 94 Allis-Chalmers Certified Service shops throughout the country give you economical, factory approved service and genuine parts.

Call your Allis-Chalmers Authorized Dealer or Sales Office for your motor needs, or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 51B6210.

Safety-Circle, Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-3340

Sold . . .
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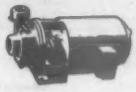
by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

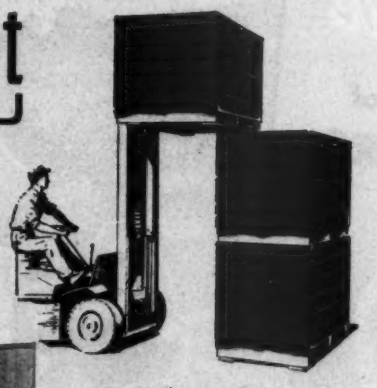


PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

THIS ▶ OR THIS ▶

Generalift
★ ★ ★ ★ ★

pallet boxes



CUT MATERIALS HANDLING COSTS

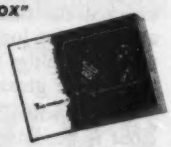
REDUCE STORAGE COSTS

- for large business
- for small business
- for ALL business

More and more manufacturers are helping solve their materials handling problems and storage problems with Generalift Pallet Boxes. It's the versatile container that sharply cuts costs . . . and helps step up production . . . because ONE workman, fork-lift truck, and Generalift Pallet Box do the work of many employees. Write us. We'll promptly provide full information on the Generalift Pallet Box, on ANY of our shipping containers.

WE WILL MAIL FREE COPY OF "THE GENERAL BOX"

This colorful booklet illustrates and describes the many advantages of the Generalift Pallet Box. We will be glad to mail upon request.



General **BOX COMPANY**
★ ★ ★ ★ ★
engineered shipping containers
GENERAL OFFICES:
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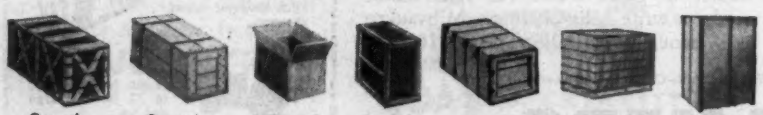
Cincinnati, Denville, N. J., Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Sheboygan, Winchendon, Continental Box Company, Inc.: Houston, Dallas. General Box Company of Mississippi, Meridian, Miss.

ALL TYPES OF ENGINEERED SHIPPING CONTAINERS



General Wirebound Crate | *General Nailed Box* | *General Corrugated Box* | *General Cleated Corrugated Container* | *General All-Bound Box* | *Generalift Pallet and Pallet Box* | *General Watkins-Type Box*

YOU MUSTN'T MISS—

Begins on page 212

presses. This list makes it easy for a contractor's engineering department to allocate jobs intelligently. The brochure also includes an illustrated list of the components and assemblies made by Ferguson during the last war, and a list of the contracting firms for which the work was done.

The brochure is available free to manufacturers who may be contemplating similar bids for defense work, as well as to contractor firms looking for the kind of facilities Ferguson has to offer.

QUOTES

Is the Individual Big Enough?

"The crucial American question has always been: Is the individual big enough for the responsibilities of freedom? And the American answer to that American question is in showing workers where their interests lie—making them realize that a wage increase without a productivity increase is no bargain for anyone, and costs them customers—using their obvious interest in their stake in their jobs to show them the only way they can guard and increase that stake: through increased productivity!" — *They Say*, published by the Sheldon-Claire Company.

Survival of a System

"If our democratic system is to survive—if we are to avoid the horrible fate that has befallen the lackluster, incentiveless piece of machinery which masquerades as man in the state-controlled countries—we must find that survival in better employee and public relations."—*Charles S. Watson*, vice president, Canadian Breweries, Ltd.

On Dollar-a-Year Men

"It's beginning to look as if all of us will soon be dollar-a-year men—after taxes."—*Phoenix Flame.*

More on next page

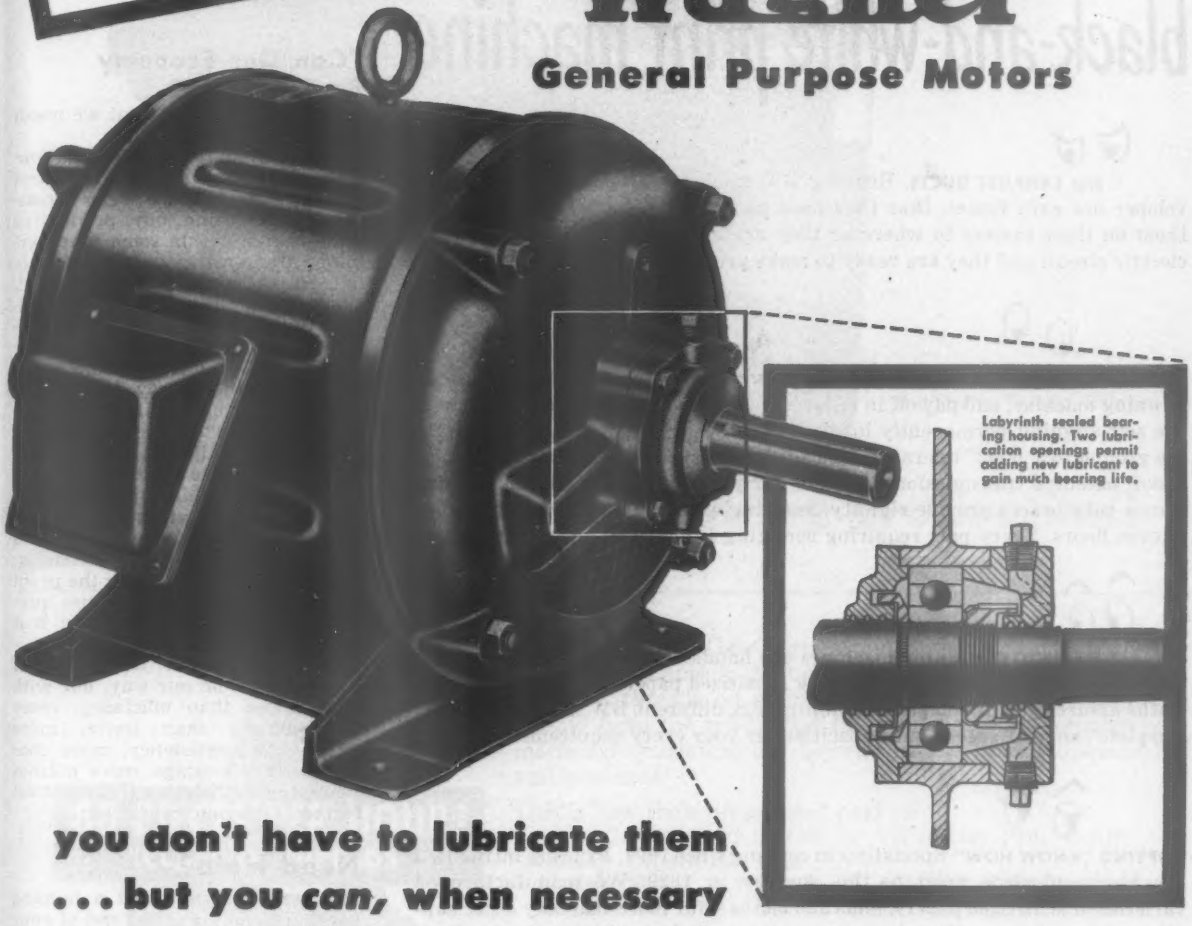
Wagner®
ELECTRIC MOTORS
... the choice of leaders in industry

for longer useful motor life –

YOU CAN'T BEAT

Wagner

General Purpose Motors



you don't have to lubricate them ... but you *can*, when necessary

Wagner Steel-Frame Motors have been *proved*—durable, dependable and trouble-free by more than twenty years of hard usage in industry after industry. They have a reputation for long, useful life. Among the many engineering features that have built this reputation is the ample sized, sealed, bearing housing.

Wagner bearing housings are effectively sealed against the entrance of dirt or grit that cause rapid wear. You don't have to lubricate the bearings (motors in the smaller frame sizes will often operate for the life of the unit without lubrication) but, Wagner Motors are provided with two lubrication openings—you *can* lubricate them, to add much useful motor life where the motors are used in tough applications.

Wagner's new Bulletin MU-131 gives full information on the proper lubrication of electric motors—write for your copy. Thirty-one branches, located in principal cities, are ready to assist you whenever you have a motor problem. Consult the nearest branch, or write us.

WAGNER ELECTRIC CORPORATION
6412 Plymouth Ave., St. Louis 14, Mo., U.S.A.

Wagner Electric Corporation
1891 1951

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

MU-9

4 things to look for when you need a new black-and-white print machine

NO EXHAUST DUCTS. Bruning BW machines do not use a vapor developer nor emit fumes, thus they need no exhaust ducts. You merely roll them on their casters to wherever they are needed, connect them to your electric circuit and they are ready to make prints.

LESS MAINTENANCE. Craftsmanship and top-quality materials mark every Bruning machine, and pay off in reduced maintenance. All essential bearings are self-aligning permanently lubricated ball-bearings, and bearing shafts are ground to a .0002" tolerance. The adjustable speed drive is a simple, foolproof, patented transmission that runs for years without attention. Welded torque tube braces provide rigidity, assuring exact roller alignment despite uneven floors. Every part requiring servicing is accessible in minutes.

FLEXIBILITY. Bruning machines can handle *any* black-and-white print job. The *unrivalled* variety of Bruning sensitized papers, acetates, films and cloths assures you of complete flexibility. Six different BW machines offer a complete range of speeds and capacities for your every requirement.

COPYING "KNOW HOW" Specialists in copying since 1897, Bruning introduced the black-and-white print to this country in 1929. We manufacture 85 varieties of sensitized papers, films and cloths—far more than any other supplier, and our four coating plants are strategically located to guarantee fresh materials to all sections of the country. Servicing facilities and distribution are nationwide.

See for yourself why Bruning BW copying machines are best. The coupon will provide you with a demonstration or explanatory booklet without obligation. *Send it today.*

BRUNING

Specialists in copying since 1897.

CHARLES BRUNING COMPANY, INC.

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☐ Please send me information on Bruning BW machines.

☐ I would like to see a Bruning BW machine demonstrated.

Name_____ Title_____

Company_____

Street_____

City_____ Zone____ State_____

YOU MUSTN'T MISS—

Begins on page 212

"Can Our Economy Be Stabilized?

"That depends on what we mean by stabilization.

"If we mean bringing our national economy wholly under control of government; if we mean arresting and freezing our productive organization within some predetermined framework; then our economy cannot be stabilized—at least, short of complete dictatorial socialism. Such regimentation would reduce personal incentive and impair production; it would strait-jacket initiative and destroy free enterprise. If that be stabilization, I am against it, for the essence of our economy is flexibility; the merit of our system is its relative freedom.

"But if by stabilization we mean eliminating the extremes of booms and busts; ameliorating the worst effects of inflation and deflation; and spreading more fairly the profit and the pain of our defense program—if that be stabilization it is desirable and possible.

"Are we on our way to it? I think we are on our way, but with more noise than efficiency, more disagreement than unity, more cooks than consistency, more contumely than courage, more politics than progress."—*Alan H. Valentine*, former Economic Stabilizer.

Need Help?

"Next time you need a helping hand, try looking at the end of your arm."—*Fusion Facts.*

On Taxes and Benefits

"Apparently, no capitalistic system has ever been able to exist after the taking of as much as 35% of the income of its people to pay the costs of governmental operation. In all such cases, the free economy has been destroyed and totalitarianism has taken over. Here in America, we are too close to this danger point not to give due consideration to the necessity of cutting expenses of government. Making the government work for the people may become a dangerous luxury. People must stop expecting government to give them benefits for which they do not pay."—*Rep. Jesse P. Wolcott*, Republican of Michigan.

More on next page

6" x 15" Jones & Lamson Automatic Thread Grinder.

FACTS on improving production!

The New Process Gear Corporation, Syracuse, N.Y., installed a Jones & Lamson Automatic Thread Grinder to grind Class IV threads on main drive pinions. The threads are ground from the solid, after the piece has been completely machined (including the keyway in the thread diameter) and hardened.

This is how their investment paid off:

PRODUCTION: 80 CLASS IV THREADS PER HOUR
SCRAP REDUCED 50%
SUBSTANTIAL SAVINGS IN DIRECT LABOR COSTS, OVERHEAD AND GAGE COST.

In addition to better quality threads and more uniform finish J&L Automatic Thread Grinders:

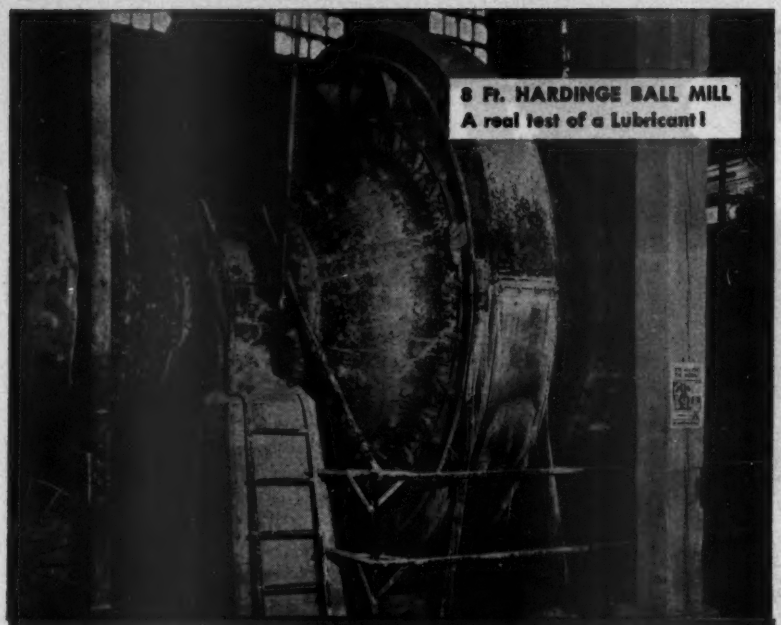
- reduce handling costs
- eliminate costly rethreading after heat treatment
- eliminate expensive retooling when specifications change
- reduce the cost of gage maintenance

Now, more than ever, the most efficient machines and methods are needed to make the most of your available manpower and material. Jones & Lamson is ready, willing and able to help you get maximum results from your turning, threading and inspection operations. Write *today* to Department 710.

Turret Lathes—Fay Automatic Lathes—Thread Grinders—Optical Comparators—Threading Dies

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Machine Tool Craftsmen Since 1835



"LUBRIPLATE No. 630-AA is practically a universal lubricant"

—so writes the Spokane PORTLAND CEMENT COMPANY of Irvin, Wash.

"**Lubriplate Lubricants** enabled us to cut the number of lubricants we were using to about half, but even then we were still using five different LUBRIPLATE Products. With the introduction of LUBRIPLATE No. 630-AA, we were able to reduce our requirements still further. Today we are satisfying all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a Universal Lubricant. Furthermore, LUBRIPLATE No. 630-AA has effected a marked savings in lubricants and labor."

Frank D. Neill
General Superintendent

SIMPLIFY YOUR LUBRICATION SCHEDULE

Lubriplate Lubricants set new high standards: They reduce friction, wear and power consumption. They prevent rust and corrosion of bearings, parts and product. They last longer than ordinary lubricants. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases to meet all conditions, usual and unusual. Write for case histories of the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE . . . CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE *THE MODERN LUBRICANT*

YOU MUSTN'T MISS—

Begins on page 212

Inflation and Production

"On the home front, inflation is one of the most powerful weapons on the side of the Communists. The only real antidote to inflation is production—production to provide enough for both guns and butter . . .

"The key to increased production is people. . . . Plant man-hour production will be what the workers individually and as a group want it to be. The workers themselves must want to see increased production before it can be realized. This attitude seldom develops unless the worker feels that greater production is worth while to him. If he feels that greater production means increased security and advancement for him, he will produce."—*Richard S. Reynolds, Jr.*, president, Reynolds Metals Company.

How to Get Out of Trouble

"There's only one way that you ever get yourself out of any serious trouble, and that's by education."—*Walter H. Wheeler, Jr.*, president, Pitney-Bowes, Inc.

Most Underrated Phenomena

"The corporate concept, being comparatively young, is quite naturally the subject of great criticism from many quarters—criticism for size, criticism for impersonal characteristics, criticism for profit.

"Now this criticism is not unhealthy. In fact, it can be fairly viewed as a force on behalf of progress.

"But the result of such criticism is that the corporate concept is probably one of the least appreciated, most underrated phenomena in the world today." — *Henry A. White*, president, The Hawaiian Pineapple Company, Ltd.

The Maintenance of Men

"When a machine breaks down, do we stand in front of that machine and 'cuss' it out? No, we find out where the trouble lies and correct the trouble. Not only that, but we also give that machine preventive maintenance: regular oiling, greasing and operating adjustments—to keep it running at peak efficiency.

"Why not apply the same technique in the area of manpower?" —*Fred C. Hauck*, in *American Bar Association Journal*.

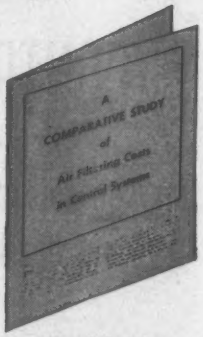
is as bad as dirty filters!

You wouldn't deliberately block your air conditioning registers. And yet, leaving in dirty filters is just as sure a way to cut air flow—decreasing comfort and raising operating costs.

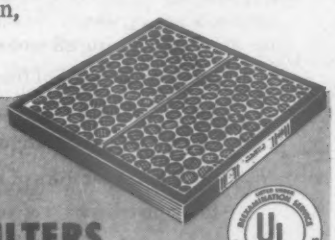
Regular, periodic replacement of air filters is a *must* if you want efficient air conditioning and low maintenance costs. How often should you replace them? As often as they get dirty . . . and that depends on your local conditions . . . in some cases as often as once a month.

Be sure your filter replacement is handled on a definite schedule, using nationally known and accepted Fiberglas Dust-Stop* Air Filters, the replacement filters that provide high dirt-catching capacity at no extra cost.

Your Dust-Stop supplier can help you set up a way of handling filters systematically. Discuss it with him today.
Owens-Corning Fiberglas Corporation,
Dept. 85-E, Toledo 1, Ohio.



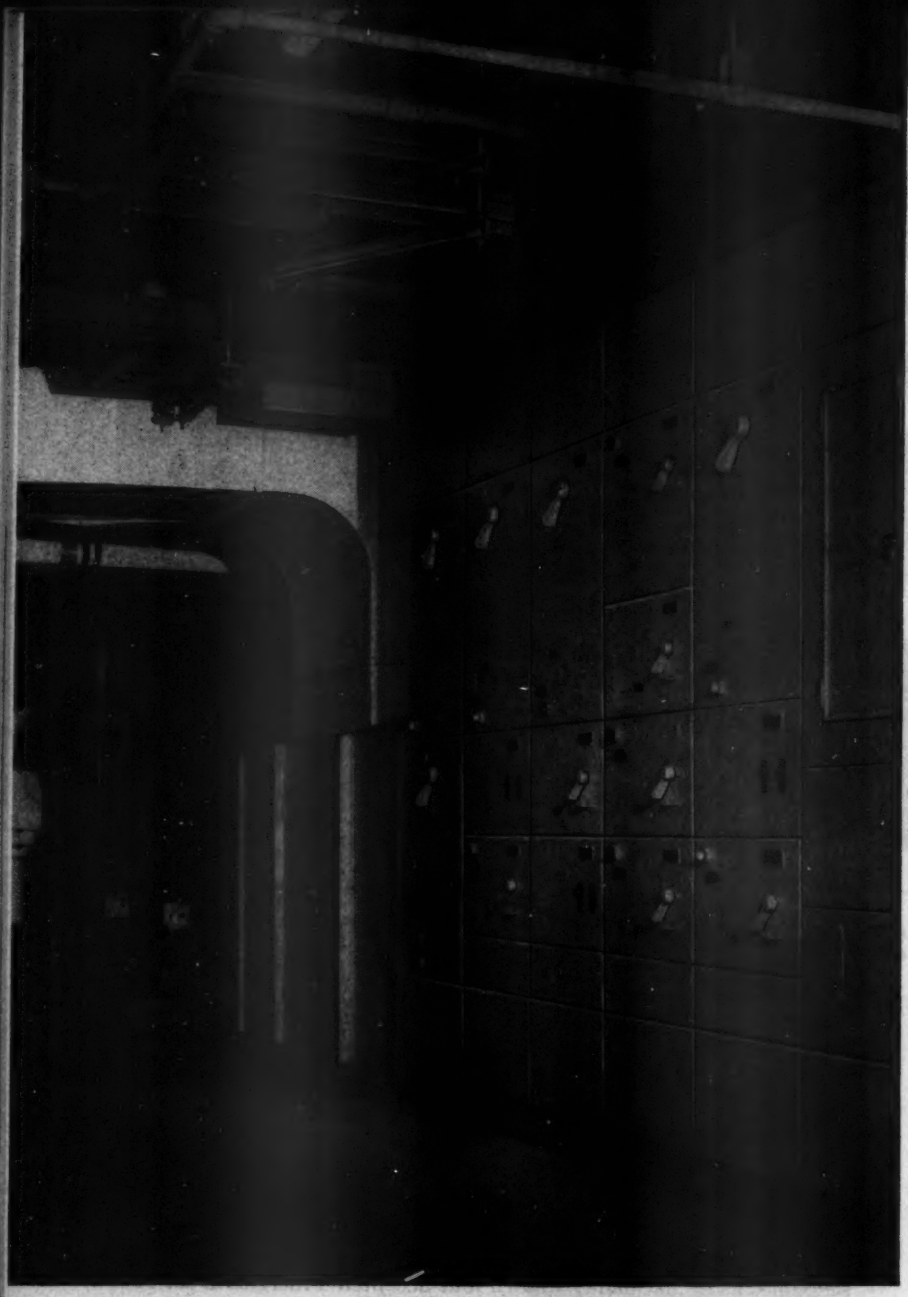
Get This Booklet—The "Comparative Study of Air Filtering Costs" contains facts, figures and charts important to anyone interested in air conditioning. A copy free on request. Write today.



OWENS-CORNING FIBERGLAS DUST STOP* AIR FILTERS

*T. M. REG. U.S. PAT. OFF.

*Dust-Stop is the trade-mark of Owens-Corning Fiberglas Corporation for impingement-type air filters made of fibers of glass. FIBERGLAS is the trade-mark (Reg. U.S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.



U. N. BUILDING ADOPTS NEW CENTRALIZED CONTROL

for convenience, safety and flexibility

AIR CONDITIONING and miscellaneous motor controls in U.N. Secretariat Building are operated through this Trumbull CENTR-A-POWER Control Center. The control center is fed from the Trumbull FLEX-A-POWER LVD busway distribution system running throughout the building.

Centralizing all motor controls in one compact, flexible arrangement of front-connected troughs is an idea that appealed to the designers of the United Nations' new permanent headquarters.

Today, operators of the building's equipment enjoy the convenience, convertibility, safety and attractive appearance of Trumbull's new CENTR-A-POWER Control Centers.

Standardized starter-and-disconnect units are grouped in pre-fabricated, rigid steel troughs, in any arrangement. Any number of troughs can be set up in a variety of formations: back-to-back, "U," "L." etc. The control units, called CENTR-A-PLUGS, which are plugged into silver-plated vertical bus bars, are interchangeable from one trough to another.

Trumbull's CENTR-A-POWER control center is a companion to the recently-announced CENTR-A-POWER switchboard, and is another in the series of new Trumbull developments for greater economy, safety and efficiency in electrical control and distribution.

Write for CENTR-A-POWER Bulletins to THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn.

LOW-COST INSTALLATION results from standardization of components. From the complete selection of troughs and control units, the exact combination can be made up to meet any requirements. Floor space is saved by the compact all-front-wired trough design. Yet the ample gutter saves time by giving easy access to wiring.

EASY TROUGH ADDITION recommends CENTR-A-POWER Control Centers for applications where needs may change from time to time. Arrangements of both troughs and controls can be easily altered or added to, and even bus capacity can be increased as conditions require without change in insulators or steelwork.

SIDE-VENTILATED CENTR-A-PLUG is stabbed in from front. Each unit contains a starter-and-disconnect unit, which may be either Trumbull's new HCI high-capacity interrupter safety switch or a Trumbull AT circuit breaker. Ventilated side construction, together with trough vents top and bottom, keep controls uniformly cool.

SAFE, EASY SERVICING is provided by the interlock which requires the disconnect handle of the deadfront CENTR-A-PLUG to be moved to OFF position before it can be opened . . . and by the quick-clip method of attaching the control unit to the trough which eliminates the nuisance of screws, nuts, and loose parts.

TRUMBULL (T) ELECTRIC

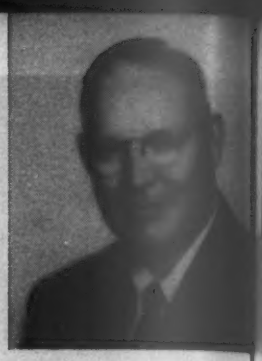
DEPARTMENT OF GENERAL ELECTRIC COMPANY

PLAINVILLE, CONN.

C. L. POPE
Lubrication Engineer, Eastman Kodak Company, Rochester, N. Y.

D. F. HOLLINGSWORTH
Lubrication Consultant, E. I. duPont de Nemours & Company, Inc. Wilmington

L. B. SARGENT JR.
Asst. Chief, Lubricants Div., Aluminum Company of America, New Kensington, Pa.



LE ROY MILLER
Lubrication Engineer, Scott Paper Company, Chester, Pa.

DON P. MORRELL
Supervisor, Fluids and Electrical Section, Ford Motor Company, Dearborn

WILLIAM M. SCHUCK
Lubrication Engineer, Armco Steel Corporation, Middletown, Ohio

TED R. WITT
Division Maintenance Engineer, Tennessee Eastman Corp., Kingsport, Tenn.

One of the subjects that packed the aisles at the Second Annual Plant Maintenance Show in Cleveland was lubrication, because it's everybody's problem. We've picked 15 questions and answers that will show you the latest and best practices in modern plants.

LUBRICATION EXPERTS ANSWER KEY QUESTIONS ON TODAY'S PROBLEMS

Q How about a good word-picture of what goes on inside a high-speed ball bearing with respect to recirculation of grease?

Pope: In my opinion, grease does not circulate through a high-speed ball bearing, but it is the oil that is retained in the grease that bleeds from the grease and does the lubricating. That theory is supported somewhat by the work Wilcock has done for the General Electric people, in which he found from a ball-bearing test against the rate of bleeding of grease that if a grease doesn't bleed sufficient oil you have a failure. If it bleeds oil too rapidly, you have early failure. If you have the optimum bleeding rate of the grease under our wide variety of service conditions you have the longest life without regreasing the particular equipment. We don't believe that grease will go through a high-speed wall without having a high rate of shear, which causes overheating and is what happens if you over-grease a high-speed ball bearing.

Q In what way can you sell top management in a small plant the idea that machines must be oiled and greased regularly and not only when bearings run hot or there is an outright breakdown?

Morrell: It is always difficult to sell the obvious. One of the best ways I believe it can be done is to analyze the costs of your oil purchases and oil distribution and compare that to what it costs you in relation to the production units lost and cost of maintenance time when you do have bearing failures. In other words, do it in dollars. Top management always understands things you say in dollars.

More on page 234

power modernization

conserves man power and materials...

Ask for your copy of pictorial bulletin No. D-60, showing Sterling Electric Power Drives Turning The Wheels of Industry.

STERLING SPEED-TROL

. . . GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

EQUIPMENT ADAPTATION TO: Load variation—sequence synchronization. Size—tension—hardness or shape of materials to be processed—machined—conveyed—blended—mixed—etc.

VARIATIONS IN: Quality—quantity—operators' abilities—etc.

STERLING SLO-SPEED

. . . GIVES YOU THE ONE BEST SLOW SPEED AND:

gives uninterrupted service—provides versatile mounting and flexibility in arrangement of machinery—saves valuable space—provides greater safety—costs less to install and use. An indispensable source of slow speed power for:

Agitators	Cookers	Kilns	Pumps
Blenders	Dryers	Mills	Screens
Blowers	Feeders	Mixers	Tumblers
Conveyors	Filters	Presses	Etc., etc., etc.

STERLING ELECTRIC MOTORS

Plants: New York 51, N. Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.

Offices and distributors in all principal cities.

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Today, more than ever, you can look to

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to guard your costs better!

After you've fought the battle of high costs, "criticals" and shortages—don't waste materials through careless handling! Tighten your control at every step! See that you have up-to-date scales—and enough scales—throughout your materials handling operations. Look into the advantages of Printweigh in stopping losses that originate through human errors. Whatever your problems in weighing, checking, testing, counting, batching or force-measuring . . . there's a modern Toledo to do a better job.

Today in your community you'll find Toledo as near as your phone; there are Toledo sales and service offices in more than 200 cities ready to help you in the selection or maintenance of scales vital in guarding your materials and costs.

Write for a copy of our 50th Anniversary Brochure . . . helpful information on modern Toledo equipment.

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TOLEDO SCALE COMPANY

TOLEDO, OHIO . . . Toledo Scale Company of Canada, Ltd., Windsor, Ontario

HEADQUARTERS FOR SCALES

LUBRICATION EXPERTS GIVE ANSWERS

Begins on page 232

Q Does your company have an entirely separate oiler group to lubricate all equipment, or is the responsibility divided between operators of equipment and electricians on motors and special oilers?

Hollingsworth: We have about 80 plants and all kinds of organizations. In our larger plants we do have a separate oiler group. It is their responsibility to take care of all production equipment. In some cases, electricians take care of it. In the majority of our plants electricians lubricate their equipment, since in most cases we have an annual overhaul of the motors, and at that time lubrication is taken care of.

Q Who should lubricate electric motors and cranes, the electrical or the lubrication department?

Schuck: That is a problem that must be determined by the maintenance setup within the plant. If you are fortunate enough to have a separate lubrication group, then it should be definitely a responsibility of that lubrication group. If, however, as in a great many plants, you are using your maintenance personnel to do lubrication work as well as maintenance work, then I should say that your setup would rest with one of your top-graded electrical men. By that I mean, one of your A-rated men, as we would term him.

Q Has anyone had experience that demonstrates on a dollar-and-cents basis that it pays to use top-grade machinists or other mechanics as permanent oilers in contrast to up-graded sweepers?

Miller: When we first started the system of having the mechanics assigned to lubricate machines we used top-grade mechanics. In most

WRIGHT *Again!*

now...new

FRAME "B"

Speedway

ELECTRIC HOISTS

● Safety, efficiency, adaptability, and rugged construction are the main qualities of these modern hoists, ideally balanced for hook suspension.

Alloy steel gears, self-lubricating ball and roller bearings, preformed improved plow steel cable, grooved drum, rigid metal weatherproof wire conduits, silver contact controls . . . these are but a few of the features that mean long life and low maintenance of the finely balanced **Wright Frame "B" Speedway Hoists.**

Hook, lug, or trolley mountings permit use of the Frame "B" Speedway in formerly unusable locations. Capacities from 250 lbs. to 1000 lbs.

Call your distributor today for full information on the Wright Frame "B" Speedway . . . or write to us direct.

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WRIGHT HOIST DIVISION
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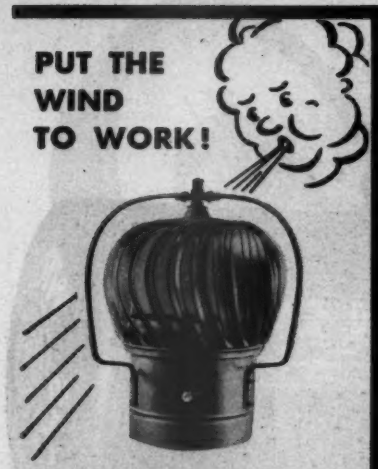

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TURBINE VENTILATOR
Economically Removes Heated Air, Fumes, Dust

This wind-driven Allen Type "C" Turbine Ventilator, made of heavy-gauge coated iron or of special non-ferrous metals, displaces from 5,740 to 267,800 cu. ft. of air per hour, depending upon throat diameter of turbine, *at no cost*—the breezes supply the power! It's ventilation that gives maximum performance per dollar spent; economical to install and maintain, too. Helps make working conditions more comfortable, keep worker productivity high. Another type, motor-equipped Electro-Wind Turbine Ventilator, is available for use in areas where wind velocities are not always sufficient. Allen Engineered Ventilation is in use in thousands of industrial and commercial establishments.

- Representatives in principal cities are listed in our catalog in Sweet's Architectural File, Section 20h.
- Write for our catalog.

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Please send me informative literature on your complete line of roof ventilators.

Firm
Name
Position
Address
City, State

LUBRICATION EXPERTS GIVE ANSWERS

Begins on page 232

cases, it did not work out too well. The mechanic had already spent a lot of time learning his trade—and a "social" question was involved. What it finally came down to was taking the man with mechanical aptitude (and there are lots of them), the type of man who makes a good automobile mechanic in your ordinary service shop, and up-grading him and training him in the work to be done. This training never stops. We pass on to him whatever we learn, and we keep it up. This type of man, who is put into a job that ordinarily he would not have any reason to aspire to, makes a better oiler than some of the mechanics we took from machines.

Q Do you have any recommendations for a reading or study course for plant oilers?

Hollingsworth: That is one of the basic reasons for the formation of the American Society of Lubrication Engineers. We have an educational committee headed by Professor D. D. Fuller, of Columbia University, and we have published three or four plant monographs. One is on hydraulics, another on physical properties of lubricants. We have a book on wear. You can get additional information from Mr. W. F. Leonard of the American Society of Lubrication Engineers at 350 South Dearborn Street, Chicago.

Q In a small plant where a lubrication engineer cannot be justified, is it good policy to use lubrication engineering practice as established by reputable refining companies?

Hollingsworth: I would say yes, but also that it is a good thing for the user to assign some individual to follow the oil company representative when he does go through the plant. He needs help. It is difficult for him to get the entire

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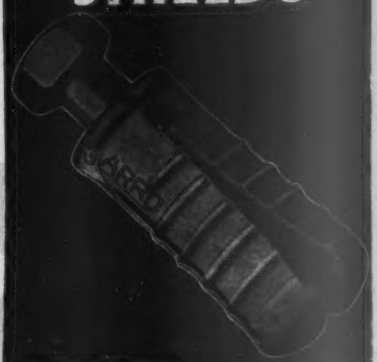
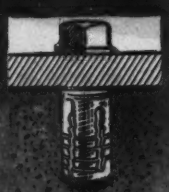
A-C-E
EXPANSION SHIELDS





Above: Machine bolt installation for securely fastening parts to surfaces.

An ARRO A-C-E EXPANSION SHIELD in the hole is your best bet for permanently anchoring machinery, fixtures, etc., to floor, wall or ceiling or anchoring eyebolts or hanger rods. The end thrust of bolts expands the back. The nut expands the shield to split the body four ways. The corrugation spacing prevents masonry from crumbling and forms their own wedges. All in all they are "engineered" to the job. Made of certified malleable iron in bolt sizes ¼ to 1" inc.—Arro's guarantee against loose installations.

Sold only through jobbers

ARRO EXPANSION BOLT COMPANY
MARION, OHIO

Why Nicholson can guarantee

TWELVE PERFECT FILES IN EVERY DOZEN

- Checking grain structure of steel to assure proper heat treatment.
- Inspecting "fracture" samples of file blanks after annealing.
- Checking drawfiled three-square blanks for twists.
- Checking drawfiled flat blanks for levelness.
- Inspecting file teeth with microscope.
- Checking edge of mill or flat files for proper taper.
- Ringing finished files for soundness.
- Testing finished files for uniform sharpness and hardness of teeth.

IT ISN'T EASY to stand up under a guarantee like that. But Nicholson has always believed that "A thing worth doing is worth doing well." As a result, Nicholson and Black Diamond files are widely regarded as the most uniformly high-quality products of their kind.

From the inspection of each batch of Nicholson-specified steel to the final packaging, every basic step of production is subjected to rigid controls, checks and tests. A few of them are shown here.

What do such high standards and such a sweeping guarantee mean to you? That your confidence in Nicholson quality is quickly gained—and permanently established. That *value*, not "price," is the best basis for buying files . . . and you get it in the *higher efficiency, faster production* and *longer life* of either of these top-quality brands: NICHOLSON and BLACK DIAMOND. Consult and buy from your industrial distributor.

FREE BOOK, "*FILE FILOSOPHY*," gives 48 pages of further information on kinds, quality, use and care of Nicholson files. Invaluable to key production men. How many copies?

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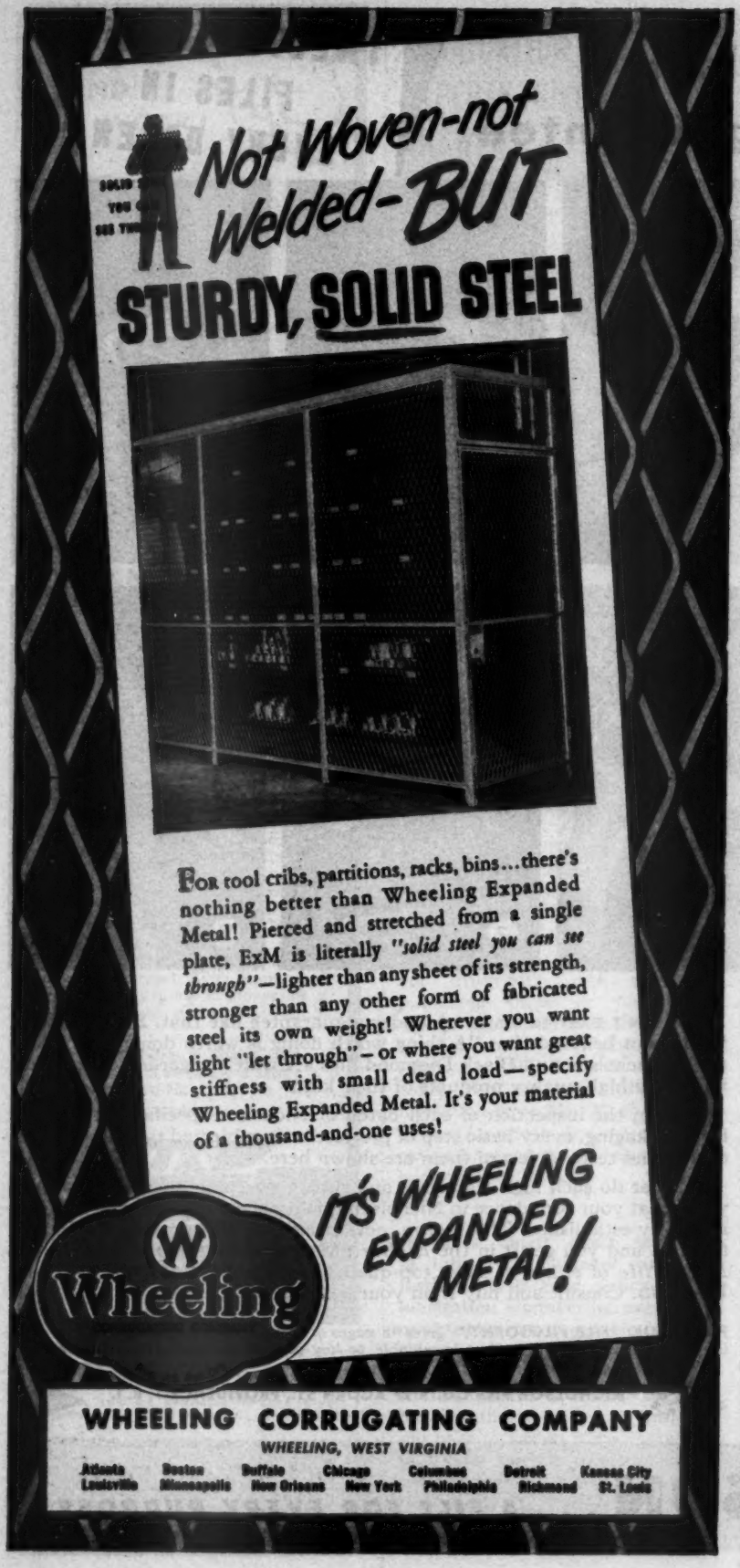
BLACK DIAMOND TRADE MARK

NICHOLSON . . . A FILE FOR EVERY PURPOSE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STURDY, SOLID STEEL
For tool cribs, partitions, racks, bins...there's nothing better than Wheeling Expanded Metal! Pierced and stretched from a single plate, ExM is literally "solid steel you can see through"—lighter than any sheet of its strength, stronger than any other form of fabricated steel its own weight! Wherever you want light "let through"—or where you want great stiffness with small dead load—specify Wheeling Expanded Metal. It's your material of a thousand-and-one uses!
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Louisville Minneapolis New Orleans New York Philadelphia Richmond St. Louis

LUBRICATION EXPERTS GIVE ANSWERS

Begins on page 232

story so that he can help you to the best of his ability. He should have someone follow him while he visits the plant, and also to follow up the job when he isn't there, because many times the most information develops when the engineer from the oil company isn't around.

Q Do you find the services and advice of the lubricant manufacturer's engineer of any value in solving lubrication problems?

Miller: Certainly, we can and do use the experienced services and advice of anybody who knows anything. The lubricant manufacturers' engineers are extremely valuable because these manufacturers are continually developing new lubricants and new methods. Best way of finding out all about them is to have these fellows come in and tell us. We do have to weigh their recommendations according to our detailed knowledge of the processes and machines involved. The final responsibility, after all, is our own.

Q What do you think of the special or trick lubes which at times appear to be the "only thing" that will work—these special lubes that clutter up one's inventory?

Sargent: In general, we look upon such lubes with a very calloused eye. We don't believe they are necessary in most cases. In fact, we probably don't use any special or trick lubes in the entire operation in our company. I hesitate very much to say that one should keep entirely away from them, because you might have the one unusual case where a special lube would be the only thing that would work. But in general, I would stay away from such things.

More on next page

These men can work in comfort, close to and facing the window, because Blue Ridge Frosted *Aklo* Glass filters the incoming daylight to reduce glare and heat. Springs Cotton Mills, Lancaster, S. C.

STEP UP PRODUCTION with

FILTERED DAYLIGHT

Good daylight—plenty of it—with reduction of glare and sun heat, are conditions that can help you step up production. They are conditions you get with Blue Ridge Frosted *Aklo** Glass.

IMPROVES SEEING. Tired, squinting eyes just aren't conducive to good work or speed. Blue-green Frosted *Aklo* Glass diffuses the sharp rays of the sun and reduces sky brightness—floods the interior with soft diffused daylight. It's like having sunglasses in your windows. Better workmanship and reduction of accidents are natural results of better seeing. With Frosted *Aklo* Glass there's no need to bother with shades or unsightly painting of the glass.

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People like to work in plants equipped with Frosted *Aklo* Glass—there's a restful pleasantness to its soft blue-green color. See for yourself how Frosted *Aklo* Glass reduces glare and sun heat. Ask your Libbey·Owens·Ford Distributor for a Radiometer demonstration. *Aklo* Glass is made by the Blue Ridge Glass Corporation of Kingsport, Tennessee and sold by L·O·F Glass distributors. Mail the coupon for full information on *Aklo*.

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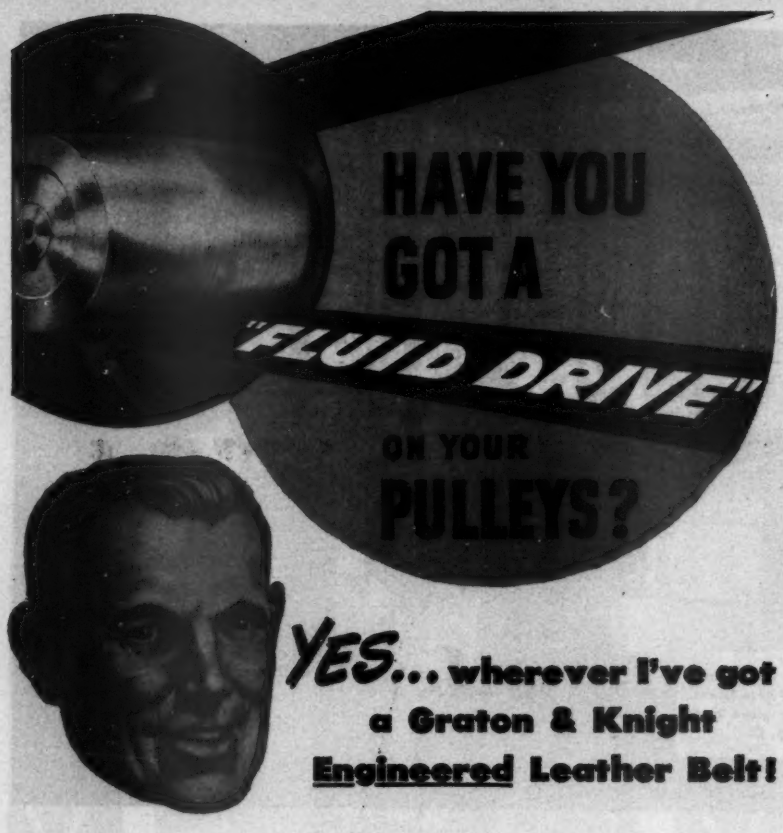

YES... wherever I've got a Graton & Knight Engineered Leather Belt!

Machine and motor manufacturers often depend upon the belt to provide a factor of safety for their equipment. Motors that accelerate quickly to full power, and machines that must handle peak loads, might stall were it not that the belt acts as a "fluid drive," absorbing starting torque and load shock.

To do this successfully the belting must possess *"Live Traction."* This includes an amazing combination of qualities: strength, resiliency, flexibility, wear-resistance, long life, and a high coefficient of friction. Unless a belt has all of these qualities it will cause wear on motors and bearings, injury to machines with reduced output, and will eventually destroy itself.

Live traction is developed to the highest degree in Graton & Knight *Engineered* Leather Belting. The best leather in the best hides are tanned and processed to develop belting that performs like a fluid drive: pulling your peak loads without slipping — absorbing the shocks of starting and stopping without damage to itself or to your equipment. And these results can be obtained under all sorts of adverse conditions.

Yes—you can drive it better with leather when the belt is engineered for you by Graton & Knight. For this company has specialized in leather belting for 100 years, and has all the answers to your belting problems. May we prove it to you?

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WORCESTER, MASSACHUSETTS

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100 YEARS OF SERVICE TO INDUSTRY

YOU CAN DRIVE IT BETTER WITH LEATHER*

GRATON AND KNIGHT

*Engineered LEATHER BELTING

LUBRICATION EXPERTS GIVE ANSWERS

Begins on page 232

Q What do you do when, in cutting down on the number of lubricants, you use your own particular grease or oils over manufacturers' specifications, and breakdown occurs in the machine guarantee period?

Sargent: In general, when we appraise a problem of this sort we go to the manufacturer of equipment, tell him our story, and get his OK on our idea. We have been able to do this in most cases. In a few cases we have had some opposition. If we thought there was no reason for it we overruled the manufacturer's recommendation and used what we wished to use anyway. Fortunately, we have had few cases of breakdown in guaranteed periods that we could attribute to oil that was substituted. In one particular piece of equipment we had a hard time talking the manufacturers into letting us do what we wished. They said they would remove their guarantee. We said OK. And since we bought many such machines, we would buy them from somebody else. They came around shortly and we have had very little trouble.

Q Has it been determined whether or not additives of different oil companies are compatible? In other words, can additive oils of one manufacturer be mixed with those of another?

Pope: That question is under study by Technical Committee C-6, D-2, of ASTM. To date we have not found any oils that are incompatible. If anybody thinks he has any additive oils that are not compatible, this committee would like to receive them, inasmuch as we don't know how to set up a test unless we have something that fails on the test. To date, we have had no failures by mixing additive oils from any company in any proportion.

More on next page

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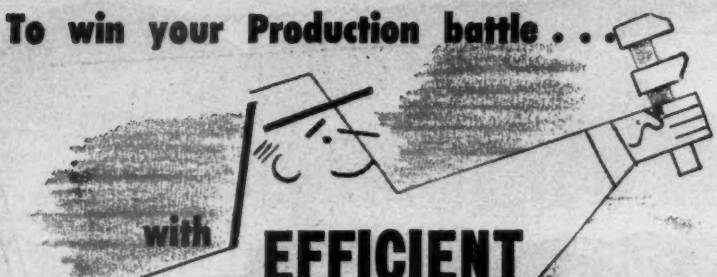

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LUBRICATION EXPERTS GIVE ANSWERS

Begins on page 232

Q Do you feel it desirable or necessary to have more than one supplier of lubricants in the average small metalworking plant?

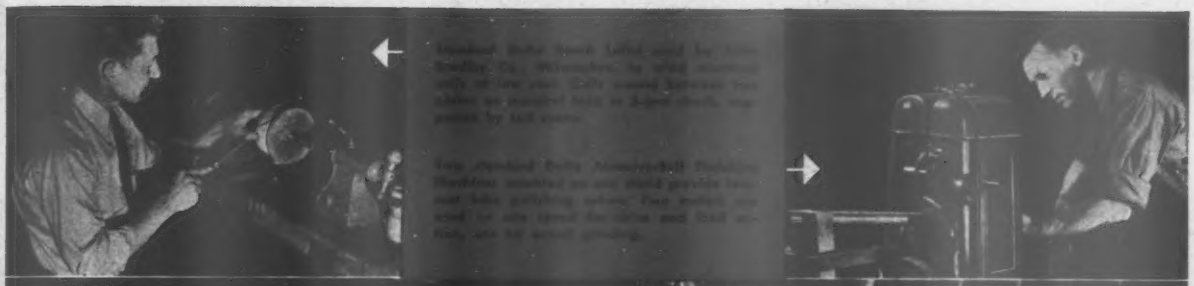
Schuck: That could be answered either way. From a lubrication point of view, I should say it would be more desirable to receive all your products from one supplier. However, if you are thinking of the problem in the long-term possibilities of interruption of service or interruption of supply of lubricants to your plant, then I would consider the dual supplier an advantage. It depends entirely upon which is the most important phase at this time. In other words, are you more concerned with simplification within the plant, or are you more concerned with the availability of lubricants during a rather trying period?

Q If you operate 24 hours a day seven days a week, how do you lubricate the bearings that are inaccessible or not safe to lubricate while the machines are running?

Witt: In all of our machinery where such points have to be lubricated frequently, we have always found some method of lubricating them —by tubes, pipelines, or other means. However, we do have some of our equipment, especially ball bearings, that we have purposely made inaccessible by removing all pipelines, etc., and plugging the housings. From our experience over the past few years, we find that such ball bearings will operate satisfactorily for two years, which is our overhaul period on those particular machines. At that time they are hand packed.

Q Where automatic lubrication systems are used, what is the advisability of having a failure indicator in the lubrication system to avoid shutdown of the basic machines involved.

More on next page



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wiper worry
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Lucky? Not a bit—he's just smart!

He decided no makeshift Wipers for *his* plant! He wanted to save time, money and worry by having the best. So he discovered that KEX towels are super-absorbent, softer, uniform in size, hygienically clean and made for orderly shop housekeeping. He also went for the fact that a percentage of KEX towels is printed with safety slogans.

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295 Fifth Ave., New York 16, N. Y.

LUBRICATION EXPERTS GIVE ANSWERS

Begins on page 232

Morell: The value of such practice is relative. On large equipment such as presses, and rather involved equipment, it is usually advisable to have some indication of failure. Sometimes your indicating system or shutdown system gives you more trouble than your lubricating system. You may have an indicating system that is easy to interlock, yet it might be a system that gives you a lot of trouble. Another system may be hard to set up as far as indication is concerned, but a very dependable system. There are some failures you can't indicate from the line to the meter unit to the bearings. If that type of system fails, you don't know about it just by visual inspection.

Q What is your method of scheduling the frequency of lubrication of equipment?

Witt: We take the recommendation of the lubrication engineer and rely on his experience as to how long a certain bearing should run without greasing. When a lubrication schedule has been set up we supervise it closely and follow it up until its validity has been established. We modify the schedule as dictated by inspections, because the best lubrication engineer will misjudge occasionally as to just how long a lubricant will last. It's a lot of work and requires a lot of close observation to keep up with it.

* * *

This is the second of three installments of Questions and Answers from the Plant Maintenance Show held in Cleveland last January. The first—on records, maintenance costs, and preventive maintenance—was published in April, page 74. The third—on painting, sanitation, and training for maintenance—is scheduled for June.

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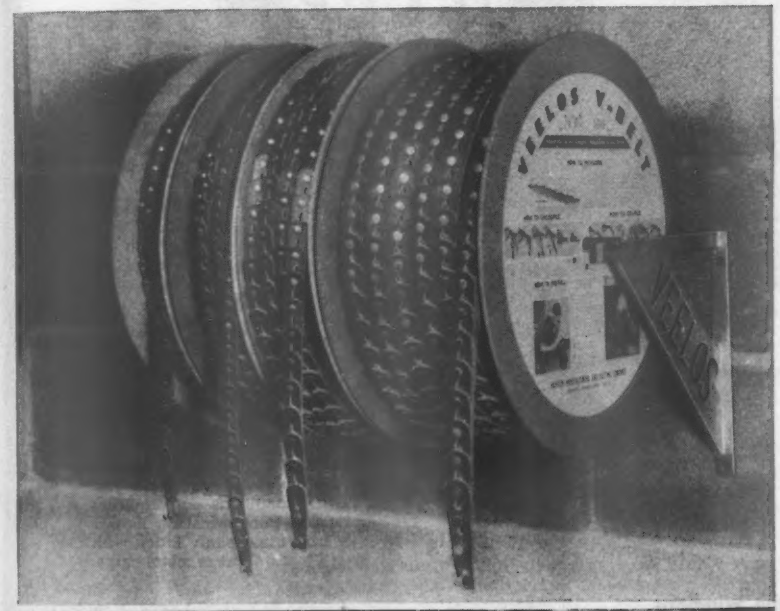

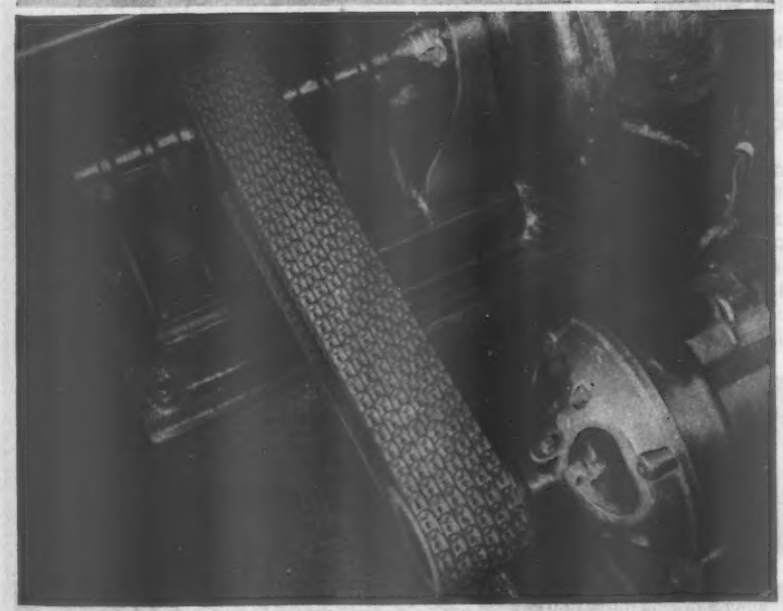

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Veelos pays for itself by reducing required v-belt stocks. Just 4 reels of Veelos cover *every* v-belt need (up to 316 sizes) in the O, A, B and C widths. Stock only one reel for each width of belt you use—and *any length is readily available.*

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Veelos pays for itself because it can be installed quickly and easily without dismantling outboard bearings or moving motor. Individual belts can be adjusted by simply removing or adding links.

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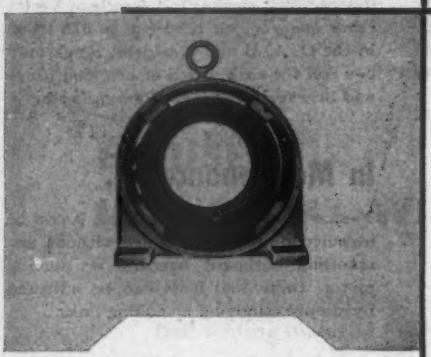
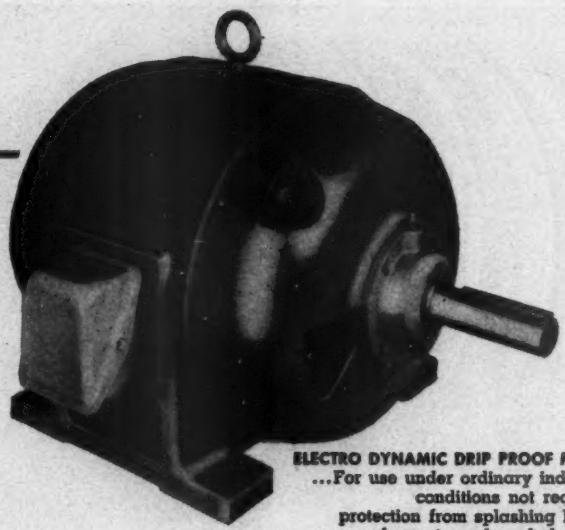
laugh at down-time!





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...For use under ordinary industrial conditions not requiring protection from splashing liquids or from atmosphere laden with dirt or metal chips.

Extra Care and Superior Materials At the Windings Reduce Motor Failure To the Vanishing Point

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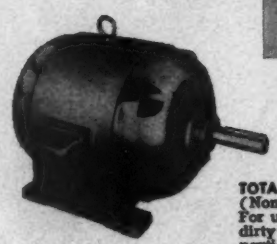
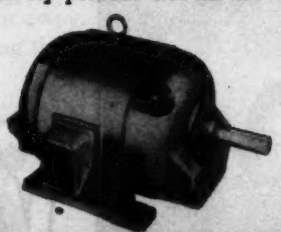
...For dirt-laden atmosphere, especially where the installation requires a motor of compact dimensions.



TOTALLY ENCLOSED (Non-Ventilated)...
For use in exceptionally dirty atmospheres, particularly when metallic dust is present.



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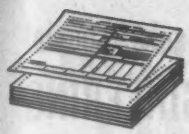

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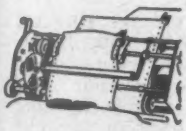

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Registers 2 *different* forms for 1 continuous typing operation

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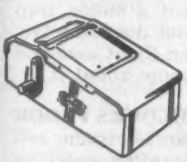

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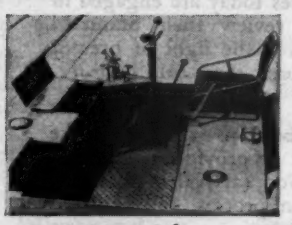
Firesafe



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WISH YOU COULD TACK THINGS TO STEEL OR CONCRETE? Why not, says Ramset Fasteners, Inc., Cleveland 11. The Ramset fastening tool will drive a pin or threaded stud into a wall, beam, or ceiling in a matter of seconds. There's a wide choice of fixtures for special jobs.

HERE'S MORE HELP ON PICKING THE RIGHT STEAM TRAP: It's a 36-page booklet on "Solving Steam Trap Problems" for men who specify, install, or service steam traps. If you've got a steam trap problem this booklet doesn't solve, The V. D. Anderson Co., Cleveland 2, would like to know about it.

WHEN TRAFFIC BLOCKS FLOOR REPAIRS: You can let traffic roll within 60 seconds after patching with Swift-Floor, says The Monroe Co., Inc., 10703 Quebec Ave., Cleveland. It's good for wood, concrete, brick, or steel. Bulletin No. 108-11.

VIBRATION ISOLATORS FOR EXTREME TEMPERATURES: All-metal isolators are suggested in catalog 509 by the Barry Corp., Watertown 72, Mass. Available in unit and mounting base types.

More on next page

Here's why the Delphos mill chose LINK-BELT BULK-FLO Conveyors

Link-Belt Bulk-Flo Conveyors (indicated by arrows) at Delphos Grain & Soya Products Co., furnished to The V. D. Anderson Co., as part of contract for complete oil extraction unit.

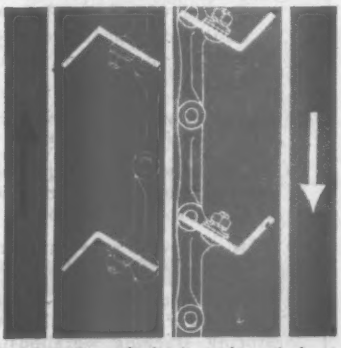
Cutaway of Bulk-Flo vertical run shows material conveyed safely in series of compartments—carrying practically a 100% pay-load.

☛ clean, dust-tight operation
☛ safe, gentle handling
☛ self-loading to capacity

The Link-Belt Bulk-Flo Conveyor handles a wide variety of free-flowing materials, safely and economically, in a minimum of space. It is entirely self-loading to capacity... operates gently to reduce degradation of material and power consumption... is completely enclosed for dust-free performance. The versatile Link-Belt Bulk-Flo is self-discharging and largely self-clearing.

Whatever your materials handling problems, Link-Belt engineers will cooperate with your own engineers or consultants. For complete details, write direct or contact your nearest Link-Belt representative.

SEND FOR THIS BOOK
Booklet No. 2175 will help you solve a wide range of material handling problems.



Travel may be horizontal, vertical, inclined, or combination in compact, self-contained unit. Multiple feed and discharge points may be used along horizontal runs of conveyor.

LINK-BELT COMPANY Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities.

12,197

LINK-BELT

BULK-FLO ELEVATOR • CONVEYOR • FEEDER

Your Workers Look To You For *Sure* Eye Protection

Give Them WATCHEMOKET eye SAVERS

Supply your workers with Eye-Savers — the finest in plastic eye protection! Eye-Saver shatterproof lenses have great impact strength and are optically perfect to give *sure* eye safety. Workers especially like the light, comfortable fit and good looks of every Eye-Saver goggle. Available from your safety supplier in many different styles to meet all eye hazards. Model 7 (illustrated) has become the standard of industry for heavy duty applications.

FREE! *Send for magazine article giving impartial advice on best uses of plastic eye protection. Eye-Savers catalog also included.*

WATCHEMOKET OPTICAL CO., INC. DEPT. 9, PROVIDENCE, R. I.

Producers & Originators of Practical Plastic Eye Protection

Just Off the Press!

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Contains 150 Case Histories on Material Handling Problems

Packed with facts. A treasury of 150 actual case histories. 500 on-the-scene photographs of equipment in actual use! This NEW BOOK shows how industrial plants have saved millions of dollars.

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SAVE! Send $5.50 WITH THIS COUPON and we will pay postage. Same return privilege, and your money back, if you are not completely satisfied.

Good ways to solve special PLANT ENGINEERING PROBLEMS

IS YOUR LIGHTING UP TO PAR? You can find the answer in General Electric's 47-page "Planned Lighting for Industry." It tells the why, what, and how of engineering, installing, and maintaining a good system. Ask Inquiry Bureau, GE Lamp Dept., Nela Park, Cleveland 12, for bulletin LD-4.

ARE YOU SPENDING TOO MUCH ON RELAY MAINTENANCE? Anyone who wants to reduce such maintenance, says H-B Instrument Co., Philadelphia 25, may well profit from reading its catalog No. 17. It describes a mercury plunger relay that it claims doesn't pit, scale, or burn.

HOW TO METER FLOW IN BIG PIPE LINES: Ask Schutte & Koerting Co., Philadelphia 22, about its bypass rotameter. You can measure flow rates of gases or liquids in lines over 3 inches without an expensive and unwieldy "direct-through" setup.

IF YOU NOW PROCESS EXPLOSIVE MATERIALS: You may need to install an electrically conductive surface over your present floor. Condurock is a resurfacer for any type of floor, to reduce explosion hazards due to static electricity. Rock-Tred Corp., Skokie, Ill.

FLEXIBLE PIPE FOR PRETZEL BENDS: Here's a plastic pipe for low-pressure service that comes in coils in sizes ½ to 3 inches. A 500-ft. coil of ½-in. pipe weighs only 50 lb. It's resistant to many acids and alkalis. Johnson Plastic Corp., Chagrin Falls, Ohio, offers catalog.

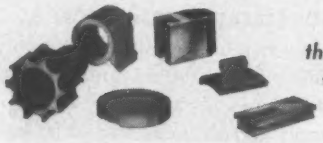
HOW TO SUSPEND OR FASTEN THAT THING? Whether it's a heavy structural item or a unit heater, you can choose your skyhook from a host of bolt adapters or clips. Eliminates drilling in most cases, saves erection time. Write R. T. Voris, 2423 Catalpa Drive, Dayton 6, Ohio, for catalog.

CARE AND USE OF FIRE HOSE: This is the title of a chapter in the fire hose catalog of New York Belting & Packing Co., 1 Market St., Passaic, N. J., that may save you from a disastrous fire. Might be a good idea to check your practices.

OILITE may relieve your shortage of critical materials

Particularly in mass-production units of small and medium size, Oilite finished machine parts and bearings can be made to your design in a broad range of ferrous and nonferrous metals and alloys, except as limited by government control. Moreover, Oilite products of ferrous base may serve excellently instead of scarce nonferrous units or as replacements for steel and castings.

When you employ Oilite you also obtain the benefits of more than 20 years' engineering, research, and production experience in powder metallurgy, together with the service of field engineers throughout the United States and Canada.



You are invited to contact the field engineer in your district or write the home office regarding the application to your needs of Oilite products.

A Note to Executives

Oilite is an effective replacement, not a mere substitute

In the last decade, more and more executives have become "Oilite minded" because the advantages are many. To meet the current situation, many of our customers have changed their specifications to replace strategic copper and tin with products of iron powder or iron powder alloys. Others are replacing iron castings, steel and aluminum with similar Oilite products.

Also of importance to executives, under conditions of urgency, are the wide adaptability, the speed of delivery, and the economy of cost, time and manpower which result from the use of Oilite finished machine parts, made from metal powders.

Intricate designs, which normally require many different machining operations, can be produced quickly and economically from Oilite. There is great freedom of design and frequently two or more parts can be combined in a single Oilite unit. Oilite eliminates up to 24 machining operations.

Delivered ready for assembly, Oilite parts save the time and investment required to tool up by standard methods. It is not unusual to be in production on a complex Oilite part within a few weeks, as compared to a possible 18-month delivery of machine tools. Trained manpower is thus released for other urgent needs.

Oilite is not a substitute. It is metallurgy's answer to the need for a new material. It may solve your problem.

President

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Heavy duty, oil-cushioned, self-lubricating bearings and finished machine parts in ferrous and nonferrous metals and alloys. Permanent filters. Friction units. Self-lubricating cored and bar stock.

OILITE PRODUCTS

Here Are The World's Sights and Sounds

which GAS helps bring into your home

DISTANCE IS NO OBSTACLE to the engineers who work with scenes and sounds. Miles are merely a challenge calling for improved methods and means of transmission. Here, in the development of these modern systems of communication, Gas continues to play another of its major roles as an industrial processing fuel.

IN RADIO AND TELEVISION the versatility of Gas is well demonstrated. The familiar tubes in receiving sets, the picture-screens of television, the giant tubes at transmitter stations—these are products of Gas-fired, glass melting tanks, forming molds, stem machines, and annealing ovens. In addition, the miles of copper wire, the thousands of filaments, and the myriad heat-treated parts of a radio or television set were processed in one of the many Gas-fired units in the production line.

FOR TELEPHONE AND CABLE manufacturing the use of Gas is so common that it's frequently overlooked. Brazing, annealing, desiccating, laminating are just a few of the many ways in which manufacturers apply Gas. Yet these processes emphasize the virtually unlimited opportunities for efficient heat-processing with Gas.

PHOTOGRAPHY AND PRINTING, two other methods of bringing you the world's sights and sounds, have at least one common bond. In the manufacture of cameras and photographic materials, and in the printing of newspapers and magazines, Gas has always been an important factor—essential in mechanical, chemical, and physical operations. To enumerate each application is unnecessary but it's in these widely varied fields of communication that the versatility of Gas is demonstrated.

FOR ANY INDUSTRIAL APPLICATION in the manufacture of communications equipment, metal products, textiles, chemicals, foods, the advantages of Gas can be readily proved. There's always a way to do production-line heating simply and economically with Gas—call your Gas Company Representative for help with your problems.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

MORE AND MORE... THE TREND IS TO GAS

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for AIRCRAFT... TV... RADIO... ELECTRONICS

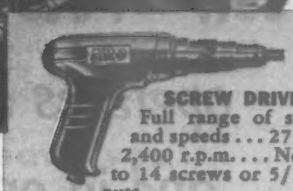
...many other industries

DRILLS—Speedy, powerful for metal, plastic or wood. 500 to 17,000 r.p.m. Up to 1/2" capacity.

Photo courtesy Lockheed Aircraft Corp., Burbank, Calif.

Photo courtesy Solar Aircraft Co., San Diego, Calif.

Photo courtesy DuMont Laboratories, Inc. E. Paterson, N.J.



SCREW DRIVERS Full range of sizes and speeds... 275 to 2,400 r.p.m.... No. 0 to 14 screws or 5/16" nuts.

GRINDERS—Complete range ...high speed turbine, heavy duty vertical and horizontal grinders, 2" production grinders ... 17,000 to 75,000 r.p.m.

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NEW HEIN-WERNER "PUSH and PULL" HYDRAULIC JACK

operates at any angle and in any position!

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Hein-Werner also manufactures a complete line of Hydraulic Industrial Jacks in models of 1½, 3, 5, 8, 12, 20, 30, 50 and 100 tons capacity . . . See your industrial supply distributor, or write us.

Even with ram in close quarters, the six feet of hose connecting ram with the pumping unit permits free and easy operation of this jack. Great for pushing, pulling, pressing, spreading and clamping jobs.

Available in 4, 10 or 20 ton capacities, with a wide range of attachments.

HEIN-WERNER CORPORATION • WAUKESHA • WIS.

NEW MATERIALS

LASTING PROTECTION is provided by a new air-drying plastic coating made by U. S. Rubber Co., Rockefeller Center, New York 20. It's ideal for spraying on tanks, pipes, and structural parts exposed to corrosive chemicals or severe weathering. U. S. Royalguard has high film flexibility and impact resistance—it won't chip or crack. It requires no primer—needs only one hour drying time between coats.

STOP SEIZURE of pipe, bolts, and stud threads by coating with Led-Plate, made by Armite Laboratories, 6658 Broad St., Los Angeles 1. The metallic compound, said to be both lubricant and sealer, simplifies disassembly of thread connections. Use it on steam, gas, water, oil, and chemical connections.

HYLAG SLASHES insulation and upkeep costs on tanks, furnaces, and boilers, says its maker, Continental Coating Corp., 304 E. 44th St., New York 19. It's a multiuse refractory insulation with temperature range from 150 to 2200 degrees F. You spray or trowel it on brick, metal lath, or concrete block. Hylag dries to a smooth finish that will withstand shock and abrasion.

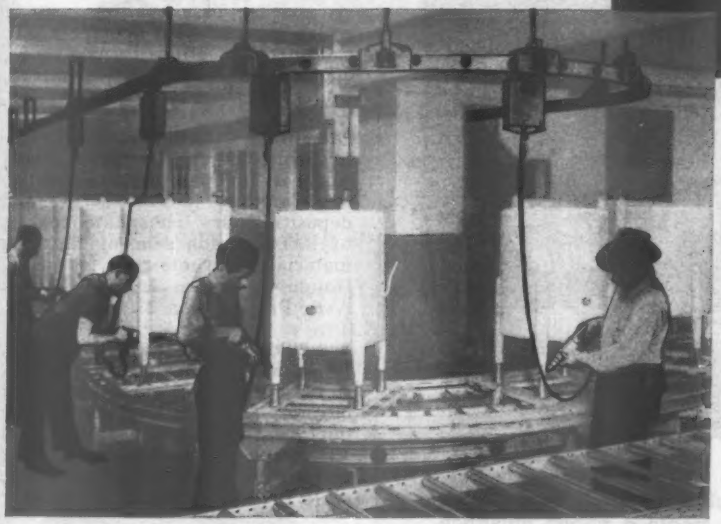
WAX THAT WON'T MELT? It's possible with a new process developed by the Flexrock Co., 36th & Filbert Sts., Philadelphia 4. The specially treated waxes are slightly harder than the unprocessed kinds, and have a higher softening point—but they won't melt even at the combustion point. They are being used now for mechanical packing.

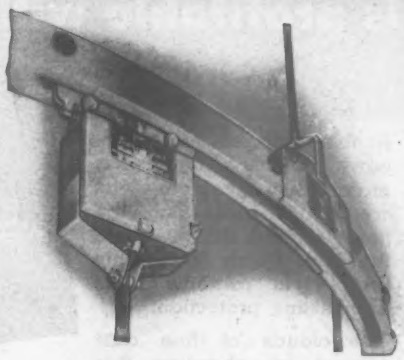
More on next page

Appliance manufacturer steps up production with *mobile power system*

BEFORE—Long, entangling extension cords from old-fashioned, stationary outlets wasted valuable time, jeopardized workers' safety.

AFTER—Trolleys move with the job, transmitting "on-the-spot" power. Some manufacturers report BullDog Industrial Trol-E-Duct saves as much as 30 minutes per man per shift.





Put this slot to work for you! It's the only answer to profitable power for modern assembly lines.

BullDog Industrial Trol-E-Duct can save you up to 30 minutes per man per shift!

PUT EXTRA profit in your production line with flexible, efficient BullDog Industrial Trol-E-Duct.

This revolutionary system carries current by copper bus bars encased in insulated steel duct. Trolleys, pulled along the continuous slot in the bottom of the duct, transmit power from bus bars to portable electrical tools, cranes, hoists and other moving "loads."

Awkward extension cords are eliminated. An eight-ounce pull moves power with the job. Workers can tap off power at any point along an Industrial Trol-E-Duct run.

And this modern system is just as flexible in meeting installation changes as it is in use. Every inch of Industrial Trol-E-Duct is salvable and can be quickly dismantled and reinstalled when it's time to move.

Yes, you can solve many a production headache with "on-the-spot" power. Your local BullDog Field Engineer will be glad to show you an Industrial Trol-E-Duct installation near your own plant any time.

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

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PIONEERS IN FLEXIBLE ELECTRICAL DISTRIBUTION SYSTEMS

Collecting rainbow dust
is profitable with DUSTUBE

At the National Lead Company in Los Angeles, a major dust problem was created in processing the finely ground, dry pigments that give Dutch Boy paints their vivid rainbow hues and lasting protection.

The clouds of fine dust caused by charging this material into the mixing machines represented a loss of valuable material, made working conditions unpleasant, and would create a public nuisance.

The Dustube Dust Collector was selected because of its top efficiency in trapping the finest dust particles, and its low cost of operation and maintenance . . . it has lived up to every expectation.

Cleanliness in the mixing room now makes quality control easier. No dust is discharged to the outside air. The men charge the mixers in comfort without respirators. The recovered pigments can be reused. Challenge American's engineers to solve your problem. An inquiry involves no obligation.

The basic reasons for the high efficiency of Dustube Dust Collectors are described in this 54-page Book. Write for Catalog 72-A.

American
WHEELABRATOR & EQUIPMENT CORP.
374 S. Byrkit St. Mishawaka 23, Indiana

dustube COLLECTORS

NEW MATERIALS

Begins on page 254

RUBBERIZED PAINT covers any interior wall or ceiling with a tough, nonporous film. You brush, roll, or spray it right on—the paint is its own primer. Brushes are cleaned with soap and water. Dirt and grease smears come off in a jiffy—washing with alkali cleaners won't fade or discolor the finish. Maker says you can retouch and never know the difference. Wallhide Satin Finish is odorless, dries in less than an hour. Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh.

HAVE A COATING PROBLEM? Continental Coatings Corp., 304 W. 44th St., New York 19, has a group of six coal-tar base coatings, one of which may fill your specific needs. Continental coatings form a tough, elastic film that resists chemicals, fumes, moisture, and heat.

PRE-FINISH CLEANER, called Hough-to-Clean 313-A, prepares metal surfaces for painting, lacquering, or japanning. It removes soil, and deposits a dry phosphate coating to increase adhesion of finishing material. Prevents rust, too. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

A 3-PURPOSE SOLVENT is Immunol. When mixed with water, hot or cold, it (1) forms a powerful detergent cleaner, (2) increases the wetting out properties of the solution, and (3) keeps the water from rusting ferrous metals. Haas Miller Corp., 4th & Bristol Sts., Philadelphia 40.

METAL SPATTER can ruin an otherwise good welding job. But not if you're using Eutecto-Mask. You spread this thin paste together with welding flux over the work surface. After welding, the dried residue can easily be removed, leaving the finish free from the effects of arc spatter or gas flame. Eutectic Welding Alloys Corp., 40 Worth St., New York 13.

YOU CAN SPRAY these synthetic enamels from the original aerosol-type container. The 12-oz. cans, handy for touch-up jobs, are said to have a valve that won't clog. M-M-A, Inc., Breneman Bldg., Lancaster, Pa., makers of Spritzit enamels, say it's good to the last drop—you've still got 20 psi. pressure in the can at the end to force out that last bit of paint.

More on next page

This man...

GIVES 1st AI[D] TO SICK PLANTS!

The plant doct[or] [de]partment look after sick or inju[red] [wor]kers, but when a machine or department is thre[at]ened with "down time" medical science is helpless while production costs rapidly rise.

But there is a man you can phone, just as you would call the doctor, or the fire or police department, and he will get on the job just as quickly, supplying the parts, materials or knowledge needed.

Emergency cooperation is this man's specialty. He has at hand about every remedy a machine or factory could need for any kind of trouble. He has prepared himself to meet the special requirements of the plants in his locality. Just pick up the phone and call him.

Capable

"This man" is an industrial distributor* or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog.

*There are approximately 2,000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $3,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

Bunting®

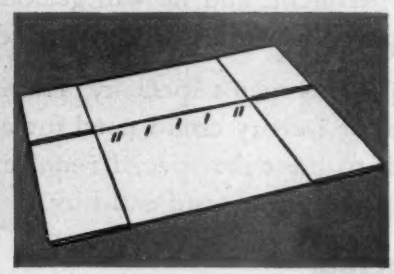
BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE [B]UNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

Cartons Sealed On The Inside Entirely From The Outside!

No sealing blade to insert under the flaps when you use this Bostitch Autoclench Stapler to top-seal your filled cartons. Just place it where you want a strong steel stitch, press the lever and the self-clinching staple seals the flaps. Pilfer-proof closure . . . easy to operate . . . faster, stronger and neater than other top-sealing methods . . . and a real cost-cutter! "*Saved $30.00 a day over previous sealing,*" writes big stove manufacturer.

BOTTOMING SHIPPING CONTAINERS with low-cost Bostitch Model F Stapling Machine. *Saves time* . . . no waiting for adhesives to set. *Saves space* . . . containers made up only as needed. *Saves losses* . . . dampness can't loosen Bostitch-sealed containers . . . less pilferage.



FOR ALL-AROUND FASTENING SECURITY, use shipping cartons with wire stitched seams, too. Container manufacturers use Bostitch stitchers on their better cartons. Combined with Bostitch stapling on tops and bottoms, this gives you the maximum strength and protection.

SEND COUPON FOR THE WHOLE STORY — Bostitch Bulletin 267 is a condensation of more than 50 years of experience in developing new, cost-saving fastening methods for the shipping room. It illustrates and describes 30 of the more than 800 different Bostitch stapling and fastening machines . . . proving how they reduce the time and costs of twelve important shipping operations. Mail the coupon below for your free copy . . . today!

PLEASE ATTACH THIS COUPON TO YOUR FIRM'S LETTERHEAD

BOSTITCH, 412 Mechanic Street, Westerly, R. I.

Please send me your new, free Bulletin 267 — "How Bostitch Can Save You Time and Money in 12 Important Shipping Room Operations."

Name..... Title.....

Firm.....

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City..... Zone..... State.....

BOSTITCH
fastens it better AND FASTER with wire

ALL TYPES OF MACHINES FOR APPLYING STAPLES
ALL TYPES OF STAPLES APPLIED BY MACHINES

Trade-Mark "Bostitch" Registered U. S. Patent Office and Foreign Countries

NEW MATERIALS

Begins on page 254

SELF-ADHESIVE FELT is available in strip lengths or round shapes from J. B. Dawn Products, 3905 W. 64th St., Chicago. You just press the adhesive-backed felt onto wood, metal, or plastic surfaces for surface protection, vibration insulation, or 101 other applications.

KURL-OFF strips paint and varnish from wood, metal, and masonry surfaces. It's nonflammable, noncorrosive, won't harm wood surfaces. Ten to fifteen minutes after you spread it on, maker claims, the old finish lies loose, ready to be whisked off. DO required. Hillyard Chemical Co., 290 Robidoux Ave., St. Joseph, Mo.

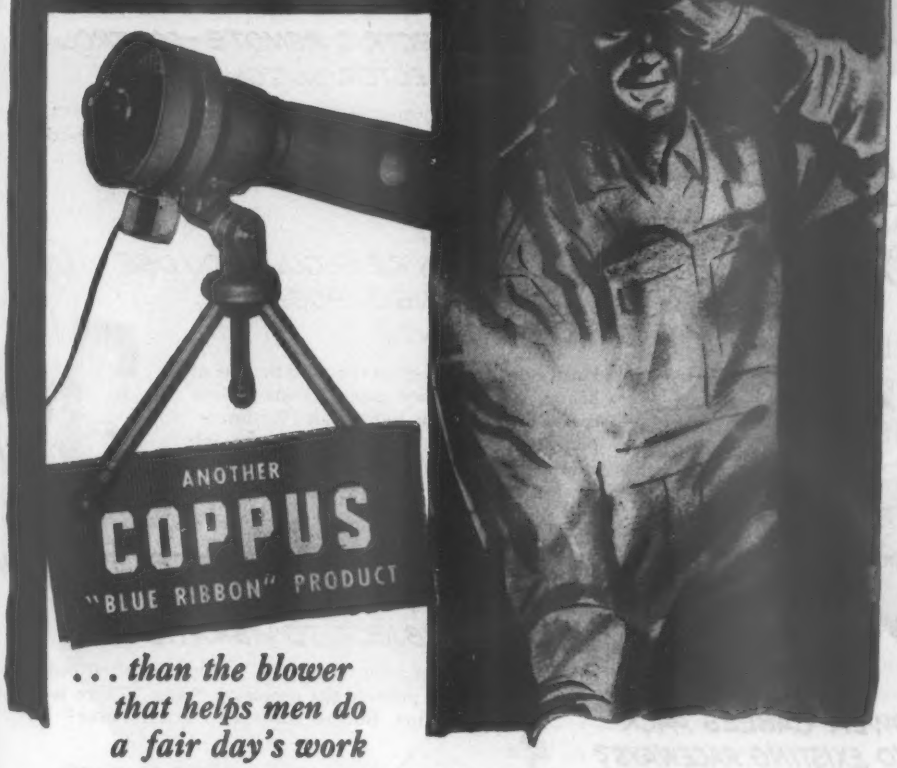
COILS IMPREGNATED with Wax S-1167 have added protection against moisture. This moisture-proofing compound was developed by Glyco Products Co., Inc., 26 Court St., Brooklyn 2, to prevent electrical components from shorting where water—particularly a detergent solution—is present.

WET ROOFS can be surfaced with a new type of roof coating. Ruffer-seal, as it's called, can penetrate surface moisture and resaturate roofing materials below with asphaltic oils. Coating stops leaks and covers entire roof with a seamless blanket. A similar plastic cement, Ruffersealit, can be used for patch-work on wet roofs, copings, etc. The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6.

CHROME PLATING may be out, but you can do the second best thing. Strathmore Products, Inc., 1970 W. Fayette St., Syracuse 4, N. Y. claims that its two new protective coatings produce an attractive, durable finish similar to chrome plating, when applied over Iridite and similar metal-finishing processes. All this, without using critical metals.

GERMELIM cleans, sanitizes, and deodorizes floors in one operation. This soap's germ-killing coefficient is said to be 3½ times that of carbolic acid—yet it's safe to use. It's effective on all types of floor surfaces, painted or not. You can use it with manual or mechanical cleaning methods. The Davies-Young Soap Co., Dayton, Ohio.

Down time due to FOUL AIR adds more to your costs...



. . . than the blower that helps men do a fair day's work

Speed fresh, cool air into a furnace, manhole, tank or other confined area where men must work and you'll get faster, better work in return.

There's a portable, easily adaptable Coppus Blower or Exhauster for just about any problem caused by stagnant, hot or fume-filled air. The Blue Ribbon stands for precision engineering that assures peak performance at lowest cost. Check and mail the coupon today for the information that fits your particular problem. Sales offices in THOMAS' REGISTER. Other "Blue Ribbon" Products in CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG, BEST'S SAFETY DIRECTORY, MINING CATALOGS.

OTHER
COPPUS
"BLUE RIBBON"
PRODUCTS

HORIZONTAL TURBINE
Six frame sizes
1 to 150 horsepower

VERTICAL TURBINE
Six frame sizes
1 to 150 horsepower

FANMIX GAS BURNER

FANMIX OIL BURNER

MAIL THIS COUPON To Coppus Engineering Corp., 105 Park Avenue, Worcester 2, Mass.

PLEASE SEND ME INFORMATION ON SUPPLYING FRESH AIR TO MEN WORKING:

- ☐ in tanks, tank cars, drums, etc.
- ☐ in underground cable manholes.
- ☐ in aeroplane fusilages, wings, etc.
- ☐ on coke ovens.
- ☐ on steam-heated rubber processes.
- ☐ on boiler repair jobs.

COOLING:

- ☐ motors, generators, switchboards.
- ☐ wires and sheets.
- ☐ general man cooling.
- ☐ around cracking stills.
- ☐ exhausting welding fumes.
- ☐ stirring up stagnant air wherever men are working or material is drying.
- ☐ drying of walls, sheets; etc., after treated with coating material.

NAME .....

COMPANY .....

ADDRESS .....

CITY .....

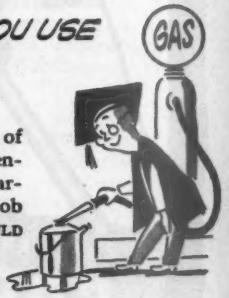
(Write here any special ventilating problem you may have.)

PREPARE FOR TODAY'S CHANGING DEMANDS WITH THESE G-E WIRING FACTS!

1. WHERE DO YOU NORMALLY LOCATE GENERAL ELECTRIC REMOTE-CONTROL MASTER SELECTOR SWITCHES?

This new multi-purpose G-E master selector switch gives homeowners control of up to nine different lights or outlets from a single point. But do you know WHAT LOCATIONS ARE RECOMMENDED FOR MASTER CONTROL SWITCH INSTALLATIONS?

2. WHAT WIRE SHOULD YOU USE IN LOCATIONS EXPOSED TO GASOLINE?



Until now, this problem required the use of heavy, lead-sheathed cables. Today, General Electric's new lightweight, hydrocarbon-resistant wire helps you do the job efficiently and economically. WHAT SHOULD YOU SPECIFY?

3. WHAT IS THE BEST PROTECTION FOR MACHINE TOOL LEADS THAT ARE SUBJECT TO VIBRATION?

Rigid protection used for this purpose is often bulky and fails to provide the necessary "play." There is a simple solution. But, DO YOU KNOW WHAT'S BEST?

4. WHY DO AVA POWER CABLES PACK MORE CURRENT INTO EXISTING RACEWAYS?

More current per raceway is a big feature of G-E Deltabeston* AVA cables. Capable of operating at high temperatures because they are insulated with heat-beating asbestos and varnished cambric—they can be used at normal ambient temperatures to crowd more current into raceways. HOW DO THEY DO IT?

5. HOW DO YOU AVOID "ROCKING" WHEN YOU INSTALL A SWITCHBOX?

The new G-E Levelock switchbox solves the problem of rocking during installation—speeds rough wiring on any job. HOW?

Answers

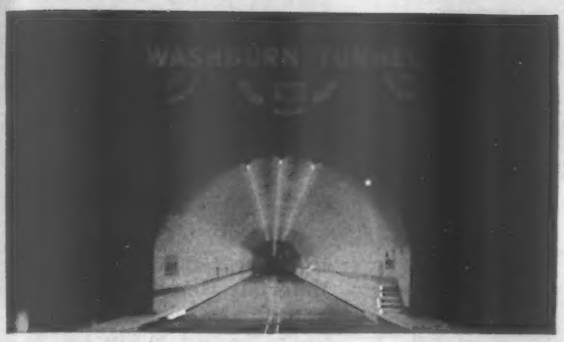
1. ☑ The most popular locations for the master selector switch are in the master bedroom and at entrance doorways. But, customers can specify its installation in any convenient spot.
2. ☐ General Electric Geotrol Type TW wire is the full name of this new gasoline-and-oil resistant wire.
3. ☐ Use G-E flexible steel conduit to simplify vibration-proof installations in close quarters
4. ☐ Deltabeston AVA cables can carry as much as 64% more current than ordinary cables with 60C rating, because two layers of asbestos insulation permit (1) higher operating temperatures and (2) more current per conductor.
5. ☐ The G-E Levelock switchbox has four leveling projections. It can't rock or tilt.

*Registered Trade Mark of General Electric Company

FOR FURTHER INFORMATION

on any General Electric wiring materials, see your G-E Construction Materials distributor, or write to Section K54-534, Construction Materials Department, General Electric Company, Bridgeport 2, Conn.

GENERAL ELECTRIC



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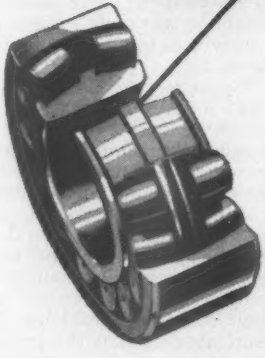

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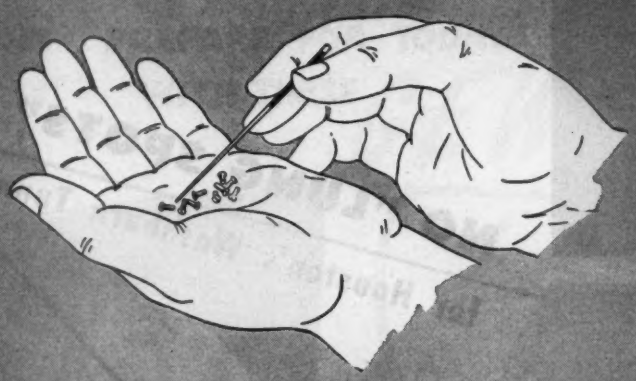

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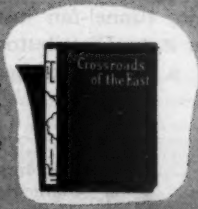

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BOOKS . . .

For copies of books and booklets reviewed, write directly to publisher listed.

. . . For Your Materials Handling Library

Modern Methods of Materials Handling

Material Handling Institute, Inc. Prentice Hall, Inc., 70 Fifth Ave., New York 11. Illustrations, flow charts, table of contents. 248 pp. $5.50.

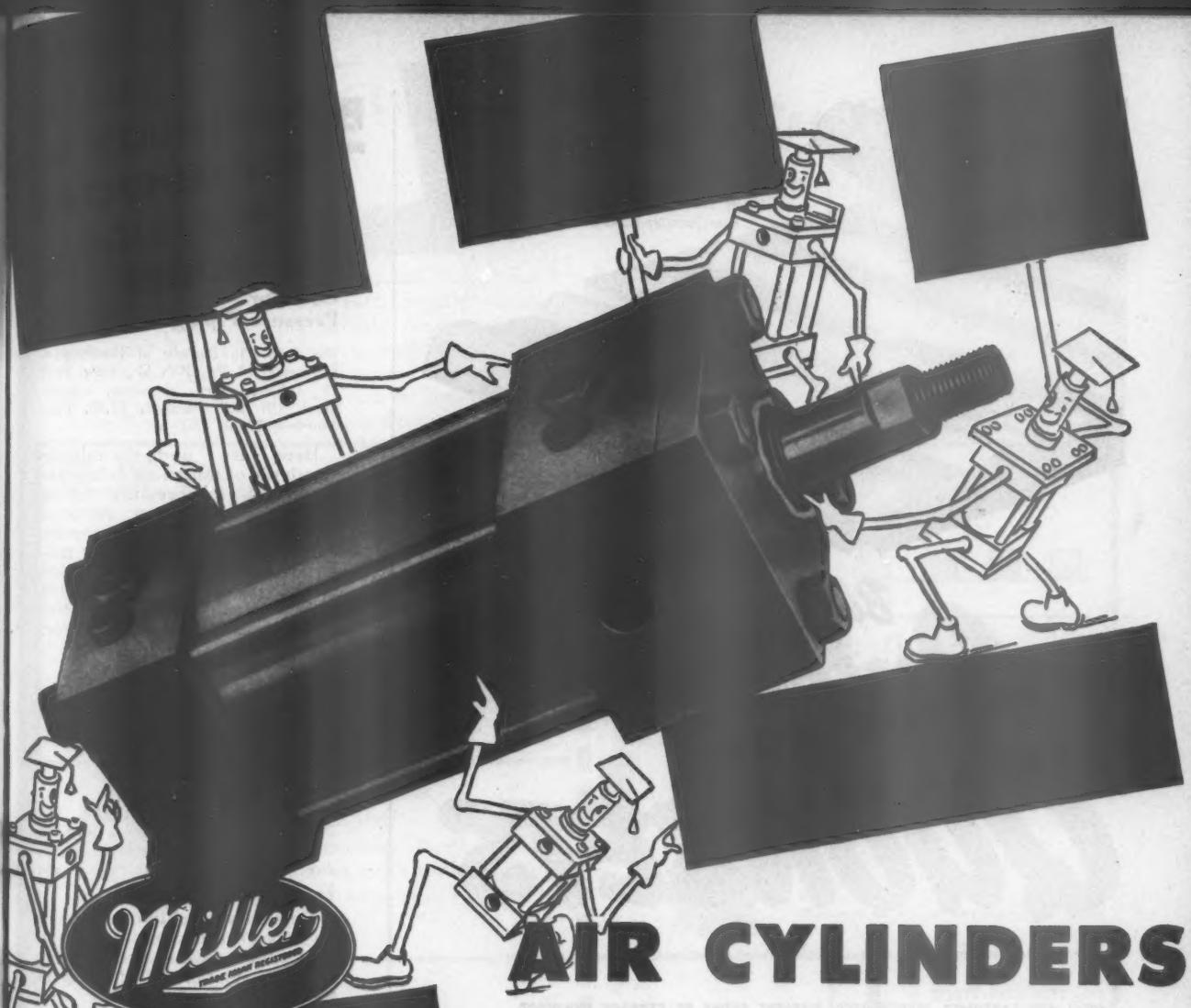
Here's good news for the men who operate industry's plants. Their biggest job today is to conserve manpower and boost output—to increase productivity. Of course better handling isn't the only way to increase productivity, but it's probably the fastest way. And certainly it's a way that's open to everybody. For everybody is in the handling business—a mighty unprofitable business, by the way, because all the handling you do in your plant doesn't add a nickel to the value of your company's product.

That's why this new book sponsored by the Material Handling Institute, Inc., comes under the heading of good news. For in it you will find dozens of ideas that will help you conserve manpower and boost output.

"The primary purpose of this book," it says in the foreword, "is to provide a broader basic knowledge for men in the materials handling division of industry and to increase their on-the-job effectiveness. The methods, types of equipment, and materials described . . . are in actual use, and the descriptions and pictures of them we obtained from many sources. These studies are not intended to be final or all-inclusive, but rather to stimulate greater progress within the field of materials handling."

To help you find the ideas most helpful to you, the Institute has classified some 130 case studies by industry—aircraft, automotive, beverages, building material, drugs and chemicals, and so on. Say you're in the food industry. First you'll want to study the 13 items in that field to see how your friends and competitors have solved their handling problems. Then, remembering that the principles are the same no matter what the product, you'll want to see how similar problems have been solved in other industries.

More on next page



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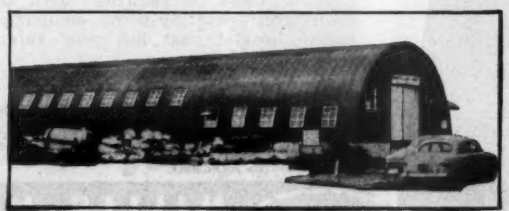

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NATIONAL STEEL CORPORATION

BOOKS...

Begins on page 262

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Code for Pressure Piping

The American Society of Mechanical Engineers, 29 W. 39th St., New York 18. Tables, charts, drawings, appendices. 101 pp. Members $2.80, nonmembers $3.50.

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. . . For Industrial Relations and Personnel Executives

Industrial Relations Year Book—1951

Edited by **BERNARD SELTZER.** The Dartnell Corp., 4660 Ravenswood Ave., Chicago 40, Ill. Illustrations, tables, directories, index, advertising. 224 pp. $5.

Now busy executives can have an easy-to-read summary of the past year's developments in industrial relations. This paperbound yearbook digests and reviews the latest trends, and reports on present practices in such employee relations fields as worker health and welfare, in-plant feeding, lighting, etc.

Appendix includes a 60-page "Who's Who in Industrial Relations," and directories of labor unions, associations, management consultants, and college courses in labor. There's also a 10-year bibliography of books on industrial relations.

. . . For Plant Engineers

Mechanical Engineers Handbook

Edited by **LIONEL S. MARKS.** McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. Illustrations, charts, tables, diagrams, references, cross-referenced and quick-reference indexes. 5th ed. 2236 pp. $15.

Marks' Handbook, the comprehensive yet concise data book on almost every branch of mechanical engineering, is now available in a completely revised

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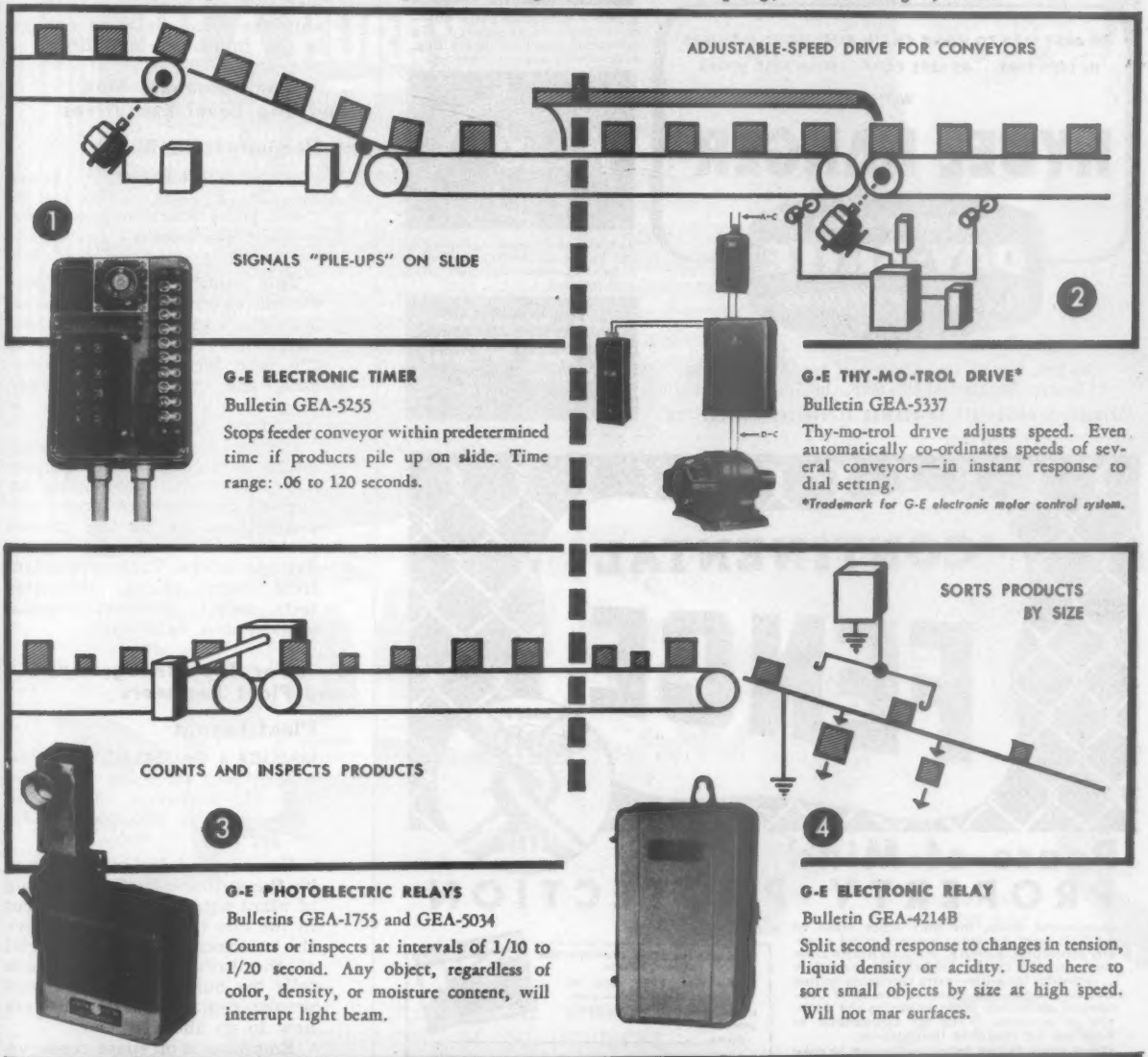

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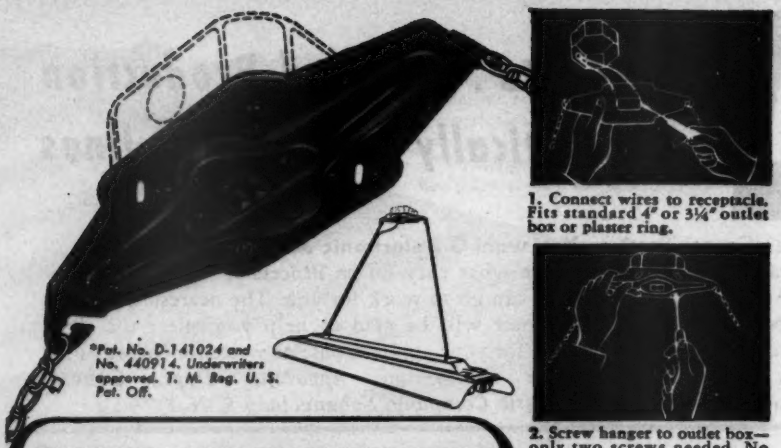

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BOOKS...

Begins on page 262

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Edited by **JOHN F. MEE.** The Ronald Press Co., 15 E. 26th St., New York 10. Charts, tables, diagrams; sample forms, tests, and questionnaires; detailed and quick-reference indexes. 1167 pp. $10.

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. . . For Top Management and Plant Engineers

Plant Layout

MALLICK & GAUDREAU. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. Illustrations, floor plans, tables, diagrams, bibliography, index. 391 pp. $7.50.

Plant layout design, as defined by the authors, is the arranging of plant equipment and services in the one best place to achieve the quickest flow of material at the lowest cost. This book tells the builders of new plants or the remodelers of old ones how to go about it.

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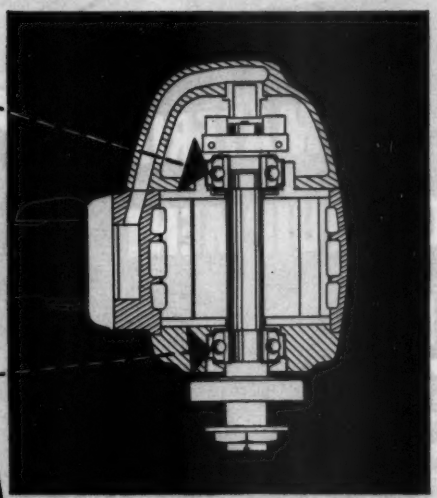

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Begins on page 262

MAXIMUM UTILIZATION OF EMPLOYED MANPOWER. Department of Economics and Social Institutions, Princeton Univ., Princeton, N. J. A revision of a World War II booklet. This is a checklist of factors that may be keeping you from getting the most from your personnel. Bibliography. 54 pp. $1

EMPLOYEE WELFARE AND BENEFIT PROGRAMS. Wm. C. Brown Co., 915 Main St., Dubuque, Iowa. A symposium on worker welfare with nine papers covering social security, pension and insurance plans, and profit sharing. Included are case histories of the effect of welfare and security programs on the profit and loss position of individual firms. 49 pp. $1.

HEALTH EXAMINATIONS FOR EXECUTIVES. Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10. Some thoughts on a program for safeguarding the health of your management group—with examples from current practice of companies that do. Tables, sample forms, appendix of cases. 59 pp. Free to policyholders, limited supply for other company executives.

TESTING APPLICANTS FOR SELECTION AND PLACEMENT. Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10. Covers the planning, installation, and administration of testing programs. Outlines the testing techniques of eight industrial concerns. References. 28 pp. Free to policyholders limited supply for other company executives.

PREVENTIVE MAINTENANCE MANUAL. Professional Expediting Service, P.O. Box 224, West Hartford 7, Conn. Here's some good reading if you're in need of a preventive maintenance program. You'll find reasons for organizing a program, and the steps involved in setting one up. Sample forms, bibliography. 41 pp. $1.50.

NATIONAL LABOR POLICY. E. C. Brown. The Public Affairs Institute, 312 Pennsylvania Ave., S.E., Washington, D. C. A review of labor policy from the Wagner Act to Taft-Hartley, a comparison of the two laws, and the present day effects of T-H. References, bibliography. 76 pp. 50c.

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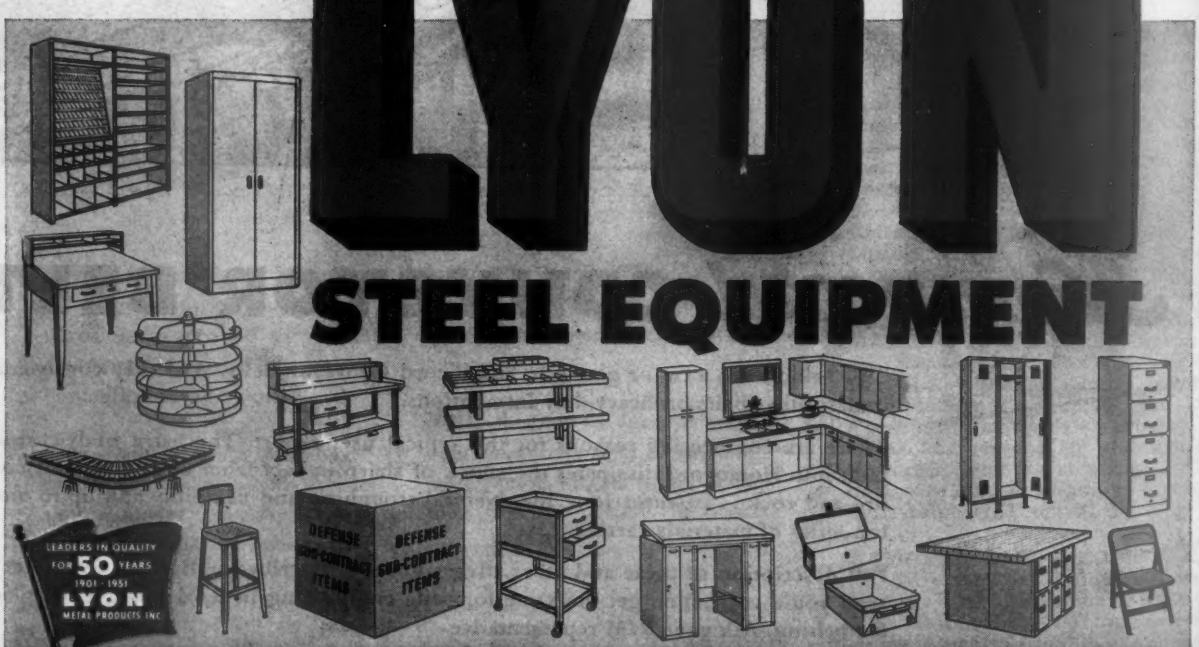

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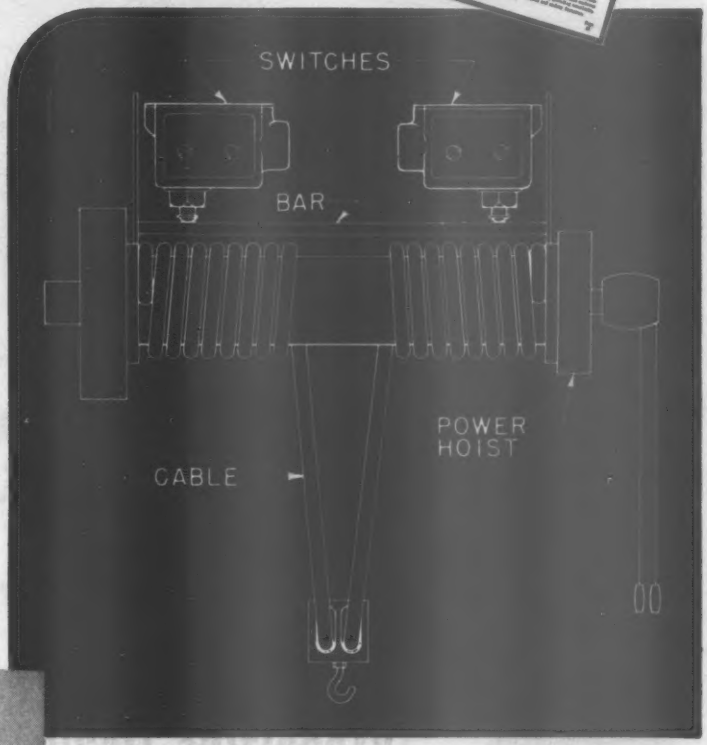

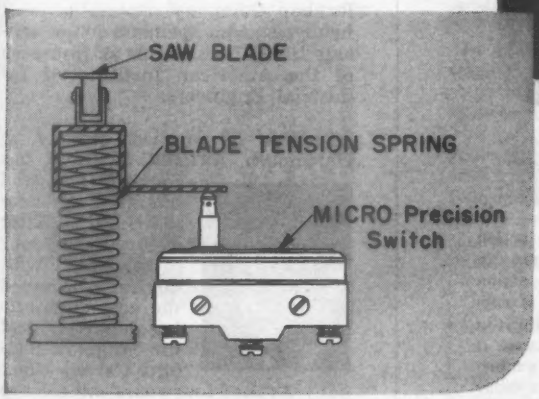

Here a snap-action switch is used to prevent injury in case the blade breaks on a high speed band saw. The switch is connected through a relay to the saw motor and a friction brake. If the saw blade breaks, the motor is stopped immediately and the friction brake applied.

On power hoists there is danger of cable breakage and damage to the hoist when the cable overlaps. This shows how snap-action switches can be installed to light a lamp or sound a horn to signal the operator should the cable overlap.

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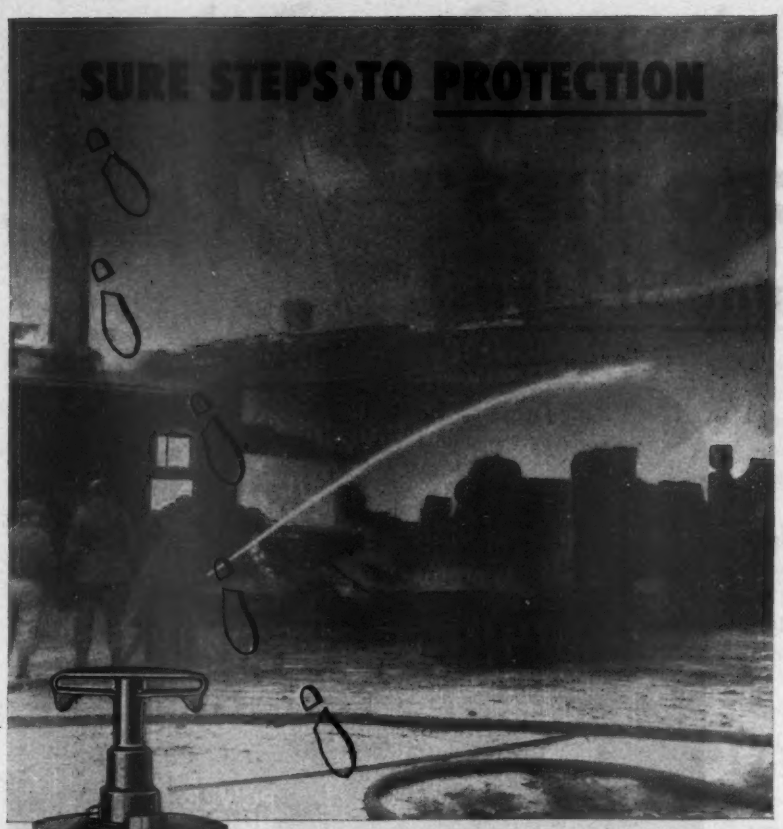

Sparks from a metal grinder ignited an open container of paint remover causing this $2,000,000 fire at Ohio National, Inc., Upper Sandusky, Ohio, Jan. 30, 1951.

Factory Mutuals and Underwriters' Laboratories Approved
VAPORIZING LIQUID EXTINGUISHERS
Sizes—1 quart, 1½ quart, 1 gallon, 2½ gallon

BUFFALO better-built

VAPORIZING LIQUID EXTINGUISHERS with... dryex

In emergencies like the one above, quick action with Buffalo Vaporizing Liquid Extinguishers can save lives and property. You know instant action against flammable liquid and electrical fires is easy when Buffalo VL Extinguishers are close by. Built-in *Dryex* assures quick, trouble-free action because it absorbs all traces of internal corrosion-causing moisture from the liquid. The double-acting Graphitar piston is also corrosion-proof and is not effected by temperature expansion or contraction. The recessed nozzle and formed ridges around the top and bottom of the all-brass shell are protection against damage. Only Buffalo offers you all these fire protection features!

Consult your Classified Telephone Directory or write for your nearest Buffalo dealer.

BUFFALO FIRE APPLIANCE CORPORATION
DAYTON 1, OHIO

BEHIND THE BYLINE

A. R. MICHAEL has held 14 different jobs in his 11 years with the Soreng Manufacturing Corporation. He started with the company as a materials handler and sweeper; has been timekeeper, foreman of raw materials, drillpress operator, punchpress foreman, model maker, and assistant purchasing agent. His present position is personnel placement supervisor. This man of many skills has edited "Among Ourselves," the Soreng house organ, and his hobbies include photography and freelance writing. On page 78 he describes a new system of testing and placing workers, which has cut turnover from 5% to 1.3%, cut cost of turnover 70%.

MAURICE D. COVERT, chief industrial engineer at Ohio Rubber Company, tells us that "the handling system described in his article (page 88) came about through "a close analysis of a special handling problem and a happy combination of equipment selected and installed by our plant engineer." An Ohio State grad, Mr. Covert has been with Ohio Rubber for the last 18 years; before that he worked for B. F. Goodrich and Fisk Tire and Rubber Company. Sports are his hobby, and he spends a lot of outside time at his duties as treasurer of the American Institute of Industrial Engineers.

Although he studied geology at Dartmouth, **ARTHUR O. HUCK** has found industrial engineering more to his liking. After a three-year tour of the Pacific with the Navy, he joined the cost engineering department of the Bigelow-Sanford Carpet Company. Art had four years' experience in time and motion study, materials handling, and work simplification, then was appointed to his present position as methods supervisor. His latest job was switching from piece to unit-load handling at Bigelow-Sanford. On page 92 he tells how the switch has saved scarce storage space and labor, reduced material waste.

More on next page

American Blower...a time-honored name in air handling

Miami, too, has a conveniently located American Blower Branch Office to provide you with data and equipment for air handling. You can reach American Blower in Miami by calling 7-4968. In other cities, consult your phone book.

TICKETS PLEASE...

Whether it's theaters, auditoriums, or sports arenas, you can count on American Blower Air Handling Equipment to keep your customers comfortably cool. The combination of American Blower fans and air washers, for example, forms a complete, compact method of comfort cooling large areas at low cost. The fan provides a supply of circulating outdoor air. The air washer cleanses, purifies and freshens the air while removing dust and water soluble odors. End result —a healthy volume of repeat business, more profits for you.

NUMBER PLEASE...

"Pleasant working conditions" is high on the list of reasons why people like to work for the telephone company. We're proud that many telephone buildings and exchanges around the country use American Blower air conditioning and ventilating equipment to create a fresh atmosphere indoors. They've found, as have many other businesses, that American Blower products provide not only high operating efficiency at low cost but their styling blends well with modern business interiors. Our nearest branch office will gladly furnish you with data and prices.

QUIET PLEASE...

Hot lights, plenty of activity and nervous tension call for good ventilation in radio and TV studios. Yet fans must operate quietly to prevent "mike" pickup. The quiet operating feature of American Blower fans makes them ideally suited for jobs like this. American Blower Sirocco Fans, for example, deliver more air per revolution than any other type fan, operate at lower tip speeds (making them unusually quiet), and save power.

MAY WE SERVE YOU?

American Blower heating, cooling, drying, air conditioning and air handling equipment can do much toward improving comfort and efficiency in your business. For data, phone or write our nearest branch office.

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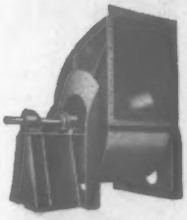
Ventura Fans

Air Conditioning Equipment



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Utility Sets

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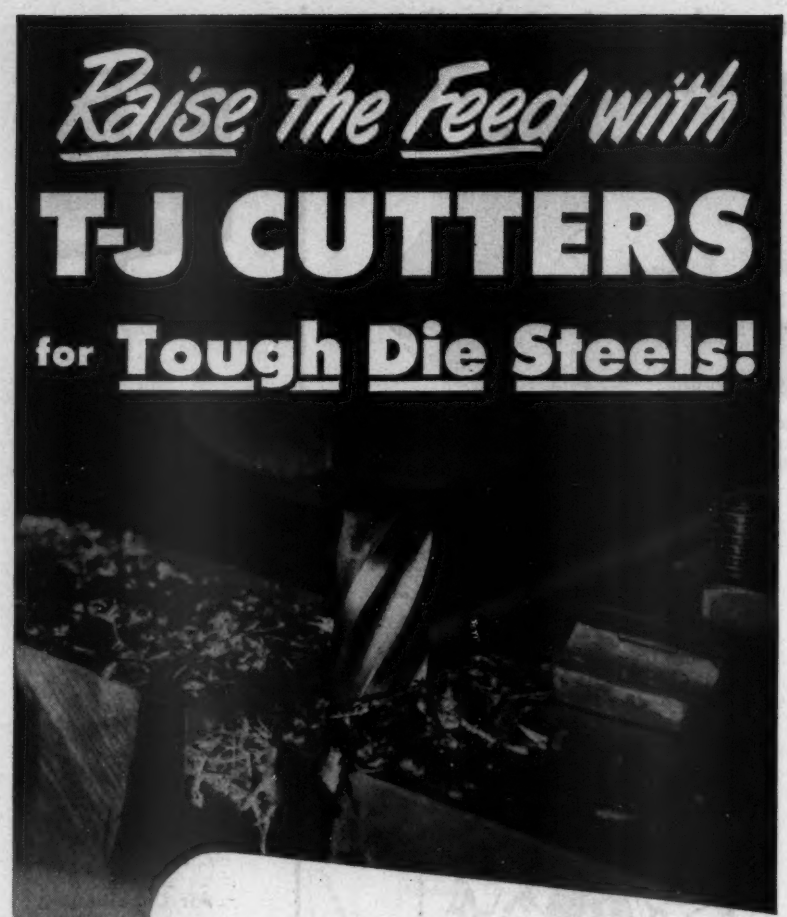
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

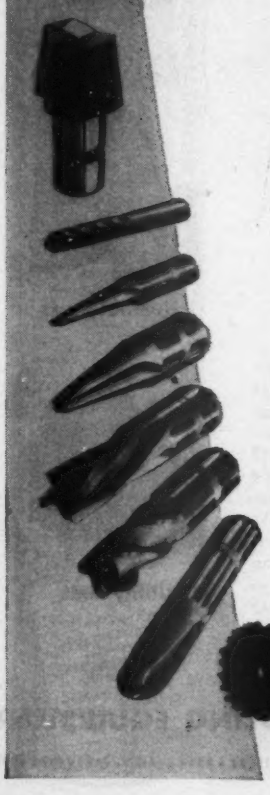
Division of American Radiator & Standard Sanitary corporation

YOUR BEST BUY AMERICAN BLOWER AIR HANDLING EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

Raise the Feed with T-J CUTTERS for Tough Die Steels!





Increase the output of your machines ... and *reduce costs* ... with T-J Die Sinking Milling Cutters! They're extra sturdy—you can raise the feed! These cutters made from a standard, extremely high grade steel ... properly machined ... scientifically heat-treated and accurately ground. This means *more work between grinds* ... easier cutting ... less breakage ... long cutter life! Wide range of T-J standard styles and sizes ... ready for your tough jobs! Send for new catalog 150. The Tomkins-Johnson Co., Jackson, Mich.

35 Years Experience

TOMKINS-JOHNSON

RIVETORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

T-J

BEHIND THE BYLINE

Begins on page 272

GEORGE H. CAHOON, chief plant engineer at The E. F. Hauserman Company of Cleveland, joined the company 25 years ago as a draftsman and contract engineer. He has spent considerable time in the field managing the erection of the steel interior partitions that Hauserman manufactures. Now he's responsible for the procurement and maintenance of plant buildings and equipment. Mr. Cahoon has supplemented his practical knowledge by night courses at Cleveland colleges. On page 94 he tells how Hauserman was able to increase its production without enlarging facilities by installing a monorail system.

It's **E. P. HESSER's** guess that Formfit's new Plaza plant in Chicago has "more conveyor per square foot than any other plant in the U. S." You can read about it on page 96. Mr. Hesser is vice president in charge of operations for The Formfit Company. He's responsible for all building construction, engineering of production facilities, office and stockroom procedures. He graduated from the Northwestern School of Commerce in four years of study at night. His hobby is working with power tools, and his new home in Chicago has a fully-equipped shop, which he hopes will keep him well, happy, and supplied with bookshelves and furniture.

KENNETH I. OXENRIDER joined the General Electric Company in February 1949 as a test engineer in the Erie Works. Since then he's "been around." He's worked in GE plants in Burlington, Vt.; Philadelphia, Pa.; Bloomfield, N. J.; Trenton, N. J.; and now he's a materials handling engineer at their Bridgeport, Conn. plant. On page 102 he tells, step by step, how a better way of handling many appliance parts was developed.

Mr. Oxenrider is a member of the Connecticut Valley Materials Handling Society and the ASME. Hobbies are swimming and sailing.

More on next page

Farval helps sheet leveler show $2500 monthly saving

WITH this machine, a kitchen range manufacturer saves nearly $2,500 a month. It is a McKay Leveler, through which steel sheets are passed to correct irregular grain structure—a cause of breakage in deep drawing operations.

Steady, economical operation of the leveler is insured by a Farval Centralized Lubrication System. Forty-two bearings are served by a manual pumping unit.

With Farval on the job, it isn't necessary to stop the machine for periodic oiling, because a few quick strokes of the pump lever once or twice each work shift lubricate every bearing—adequately and without waste. Nor is it ever necessary to shut down the leveler for repair or replacement of bearings damaged or worn out by faulty lubrication.

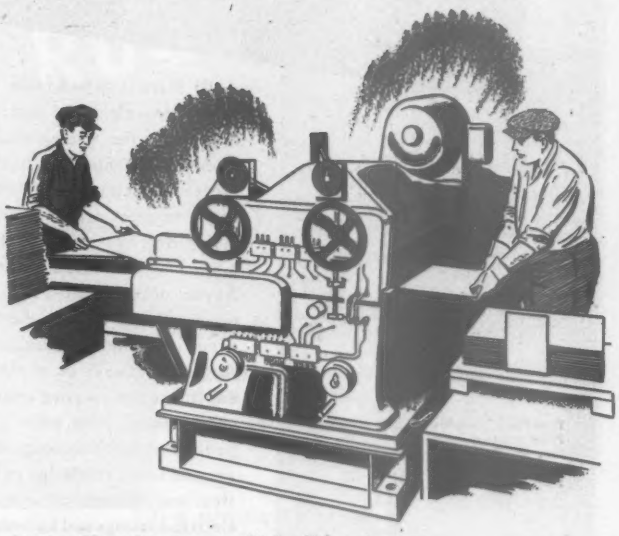
Just as the McKay Leveler soon pays for itself in savings, so also a Farval system on any machine soon pays for itself—by the savings it brings in bearing expense and lubricant cost, not to mention oiling labor and production time saved.

Farval is the original Dualine system of centralized lubrication, proved practical in 20 years of service. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned.

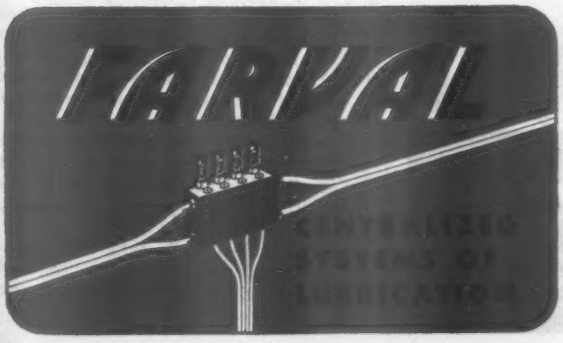
Write for Bulletin 25 for full details. The Farval Corporation, 3256 East 80th Street, Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication* No. 118



McKay Sheet Leveler on which all bearings are Farval lubricated. Farval Centralized Lubrication Systems, manually operated and automatic, lubricate over a million bearings in the iron and steel and metal working industries alone.



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● Here is dependable, scientific protection against electrical arcs that spell potential disaster in the wiring systems of chemical plants, oil refineries, hospital surgeries—wherever explosive or flammable vapors, dusts or gases are present.

Engineered to completely confine the dangerous sparks that lurk in wiring systems, Appleton Explosion-Proof equipment is easy to install and service. And among the hundreds of fittings and fixtures in the complete Appleton Line is an explosion-proof fitting exactly suited to your needs.

No matter what your lighting or wiring problems, Appleton engineers have the background and knowledge to help you to a practical and economical solution. For the finest electrical fittings and fixtures—explosion-proof or otherwise—specify Appleton, supplier to American builders for nearly half a century.

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BEHIND THE BYLINE

Begins on page 272

JAMES H. GARARD is afraid that when his wife reads the article on

the benefits of new handling equipment, she'll want some new equipment—like an automatic washer. The handling system described (see page 104) was developed as part of an over-all analysis of factory operations made at The Jeffrey Manufacturing Company. Jim's an industrial engineer, but because of all the questions he asked the workers during the study, he's been tagged a "quiz kid." An Ohio State grad, he's worked for the Lincoln Electric Company and the Ohio State University Research Foundation. A member of ASME and AIIE, his hobbies are photography, hunting and fishing, tinkering with his car.

R. M. SMITH has been employed by the Aluminum Cooking Utensil Company since his graduation from the U. of Illinois in 1936. His entire service has been in industrial engineering work, and he became chief industrial engineer in 1942. He's married and has two children. The materials handling setup described in Mr. Smith's article (page 107) is the result of several years of intensive effort to develop economies in warehousing, packing, shipping.

PERCY L. CLARK is a veteran, "up-through-the-ranks" employee of the Bridgeport Brass Company. He started work back in 1909 as one of the company's first apprentice machinists. During the years he served as foreman of the tool and die department, general foreman of machine shop and die department, and master mechanic. During the war, Mr. Clark was made superintendent of maintenance of the Bridgeport plants.

His hobbies, in addition to being "Mr. Fix-it" for anyone who has anything that doesn't work, are making and repairing old clocks, golf, and hunting.

On page 110, he tells the benefits of supplementing fixed handling equipment with industrial trucks.

When Choosing V-Belts Remember These Two Words ...They Mean Exactly What They Say!

"DEPENDABLE RUGGEDNESS" didn't get into the BWH trade mark by accident. It means *precisely* what it says . . . Bull Dog V-Belts assure steady, smooth, low cost power transmission — *uninterrupted by premature belt failure.* You save on maintenance costs, keep the wheels of power moving!

TOUGH PROBLEMS INVITED — Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting and hose problems. We're specialists in making mechanical rubber products work *better, longer.*

- **SPECIALLY ENGINEERED BWH CORD SECTION**
  Noted for high tensile strength. *Benefit:* superior load carrying capacity, ability to absorb shock loads, uniform matching when used in sets.
- **MINIMUM STRETCH**
  Results from a new, exclusive technique in processing Bull Dog Cords. *Benefit:* reduced slippage, a minimum of adjustments, longer belt life.
- **DURABLE COVERS**
  The secret's in the closeness of weave of the heavy, bias cut fabric. *Benefit:* it can take the severe wearing action of the sheave while sealing the belt against moisture, dirt and grease.
- **WITHSTANDS SEVEREST FLEXING**
  The "reason why" here is due to constant research in the development of quality - controlled compounds by BWH. *Benefit:* these compounds run cooler and do not crack or deteriorate under severe flexing.

For these reasons make your next V-Belt purchase order read "Bull Dogs" — and buy them by the set!

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

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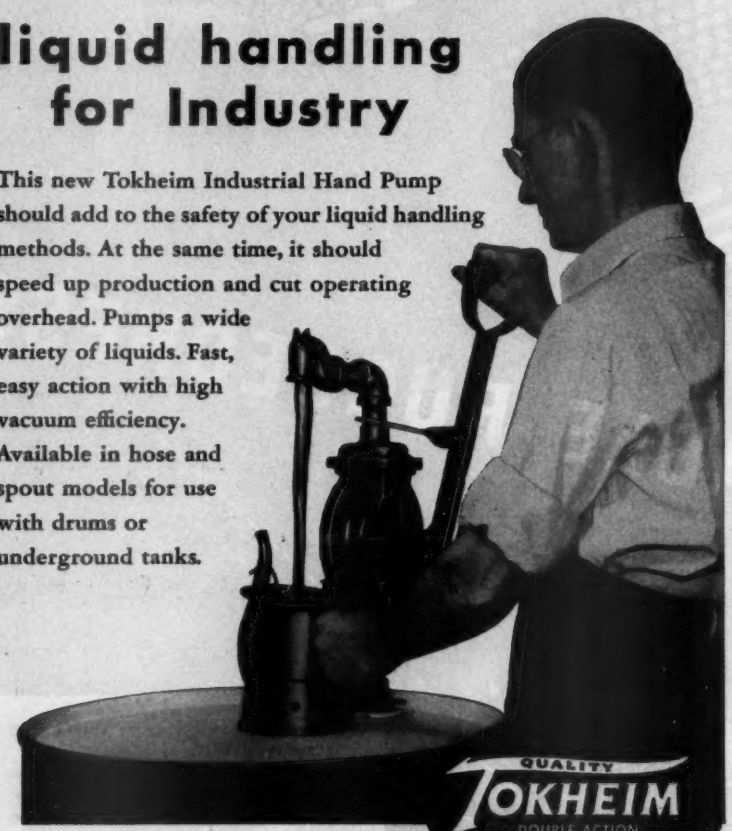
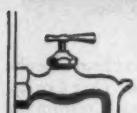
liquid handling for Industry

This new Tokheim Industrial Hand Pump should add to the safety of your liquid handling methods. At the same time, it should speed up production and cut operating overhead. Pumps a wide variety of liquids. Fast, easy action with high vacuum efficiency. Available in hose and spout models for use with drums or underground tanks.





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Special nozzle attachment eliminates dripping.

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Spilling of liquids is greatly minimized.

Pump is approved for use with petroleum liquids.

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Liquids don't reach floor to cause accidents.

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Drums may be stored or used in upright position.

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Liquids are pumped from drums at any desired speed.

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INDUSTRIAL FILMS

. . . Do you have a film or films that might help management do a better job? Help employees learn their job faster, better? If so, tell us about it and we'll pass the information on to those who can use what you have.

There's a new *Film Guide on Production and Management Methods* available. Describes briefly more than 150 motion pictures and sound-slide films on quality control, materials handling, time and motion study, work simplification, and management techniques. Gives running times, tells whether film is available on loan or sale basis. Includes article on the effective use of audio-visual methods. Can be purchased from:

Film Research Associates, 135 W. 52 St., New York 19.

Speaking of Rubber shows the importance of rubber in our daily lives. Demonstrates some of the properties of rubber, and includes scenes of the Far East rubber plantations, the production of synthetic rubber, the building and testing of tires, and the use of rubber in industry. 16mm., black and white, runs 27 min. Available from:

U. S. Rubber Co., Public Relations Dept., 1230 Ave. of the Americas, New York 20.

The Shadow of a Pioneer is designed to dramatize the growth of private industry by telling the story of a typical company. Beginning with early "tool shed" operations, the film goes on to include scenes of the present steel and wire-making processes. It stresses the importance of the individual worker in making any company go. 16 mm., black and white, runs 22 min. Write:

Keystone Steel & Wire Co., Public Relations Dept., Peoria 7, Ill.

Highway to Production tells of the part machine tools have played in providing us with the comforts of life. In-the-shop scenes show the manufacture of machine tools, from iron pouring to final inspection. 16 mm., Kodachrome, runs 30 min. Available from:

The Cincinnati Milling Machine Co., Cincinnati 9.

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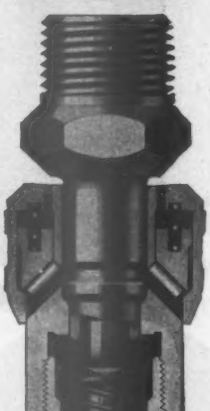
Write for Catalog

giving descriptions and sizes of complete Hansen line of straight through and shut-off couplings for hydraulic and pneumatic connections.



CONNECTION TAKES ONLY A SECOND

You save time with Hansen couplings every time you connect or disconnect a fluid line carrying gas, liquid or grease, because Hansen couplings connect or disconnect immediately—with instant automatic flow or shut-off.

To connect, merely push plug into socket—flow starts instantly. To disconnect, pull back sleeve on socket—coupling disconnects and automatically shuts off flow.

From a wide range of available sizes and types, you can select a Hansen coupling—one-way shut-off, two-way shut-off, or straight through type—each engineered for your specific application.

If you have any fluid lines in your plant, you can increase efficiency, save precious minutes, by the use of Hansen Couplings.

QUICK CONNECTIVE FLUID LINE COUPLINGS . . .

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Complete Control and Protection for Your Motors

ONE ATTRACTIVE easy-to-install steel cabinet is all you need between line and motor when you specify Allis-Chalmers Type H Starters. Contactors, protective devices, meters, relays . . . everything you need for complete control and protection of your motors is built into Type H Starters. You get:

1 **Short Circuit Protection . . . provided by current limiting fuses that are easily accessible.**

2 **Overload Protection . . . Thermal relays have compensating elements — automatically adjust for ambient temperatures — trip on motor overload only.**

3 **Safe, Accessible Cubicle . . . upper front compartment encloses disconnect type fuses; lower front compartment, the low voltage control devices; rear compartment, the high voltage equipment.**

4 **Easy Installation . . . single steel enclosure is easy to handle, internal wiring is complete, wiring terminals accessible, easy to connect.**

5 **Personnel Protection . . . high voltage fuse compartment has electrical interlock.**

6 **Meters, Push Buttons, Recording Instruments, Rheostats, and similar devices you may need are mounted on the door of the low voltage compartment.**

Other features include undervoltage protection . . . and your choice of either air break or oil immersed contactors — whichever is best for your application.

For motor control that is engineered to your job, specify Allis-Chalmers Type H Starters for motors with ratings up to 2500 hp. Call your nearby A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin for bulletin 14B6410A.

Specify Type 256 Air Break Contactor, shown, for tough, repetitive duty, longer contact life . . . Type MO Oil Immersed Contactor for normal starting duty or for service in dust laden, corrosive or very moist atmospheres.

A-3350

ALLIS-CHALMERS

For the defense of your property

Keep an eye on the windows!

When your windows fail, you've got real maintenance problems. So keep your eye on the windows. For windows (especially steel sash) may be difficult or impossible to replace in the future. But rotting of sills and rusting of steel sash can be prevented by periodic inspections and preventive maintenance.

Wherever you find a spot where water can collect, you've found a danger spot that should be corrected immediately.

HERE'S WHERE TO LOOK FOR DANGER SPOTS

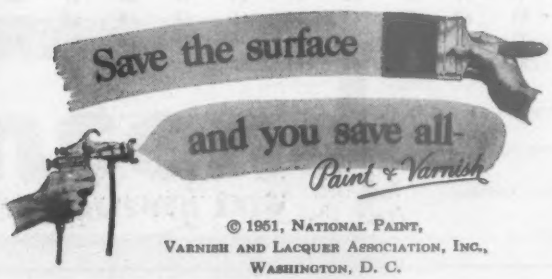
Check steel sash for rust. If rust is found, remove it immediately and repaint. Ventilator sections and sills are usually the first to need repainting because of their tendency to hold water.

Check the putty in steel or wood sashes with pen knife. If it is dry and loose, water will collect behind the putty and cause rust or rot. Remove, prime (if wood) and reputty before repainting.

Inspect the caulking around window frames and sills. If caulking is not tight, water will collect and rot butt ends and frames. Replace all deficient caulking before painting, or paint will be wasted.

Look at the paint. If fine check-marks show, the film will soon begin to crack and break down, allowing water to attack the wood or steel sash.

REMEMBER, ***"It always costs more NOT to paint."***



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. . . they're the cream of this month's crop . . . the bulletins and catalogs that will help you keep up to date on cost-cutting equipment. Tell us which ones you want. Use the handy coupon at the bottom of the page. (If somebody beat you to it, there's another on page 312.)

CONVEYORS

Gravity and Power Conveyors

1 There's a conveyor for almost every kind of package or pallet, for every materials handling operation, in this catalog. Wheel and roller gravity conveyors, powered belt conveyors, portable conveyors for stacking, loading, etc. Also a line of hand and platform trucks. The Rapids-Standard Co., Inc.

Floor Type Conveyors

2 Well-indexed for easy reference, this 90-page catalog shows conveyors for handling various materials: bulk materials, crates, logs, foundry molds. Valuable section of engineering data: basic conveyor formulas, sliding and rolling friction, chain and sprocket selection, hp. calculation. Jervis B. Webb Co.

Gravity and Power Conveyors

3 Two catalogs are offered, each 32 pages. First shows gravity roller conveyors for any layout; chain conveyors; and spiral chutes. Second on live roller and belt conveyors. Both well illustrated with typical installation photos and engineering drawings. The Alvey-Ferguson Co.

Materials Handling Directory

4 48 pages, lists a great variety of handling equipment. Conveyors, elevators, car dumpers and unloaders, cranes, and specialized machinery for many industries. A special index lists machinery by industry. Link-Belt Co.

Conveyors

5 In a 184-page catalog, this company lists many types of conveyors: gravity, apron, barrel, chain, live roller, pusher bar, reciprocating; vertical lifts and spiral chutes. Line of accessories shown. Photographs and drawings of most equipment. Typical installations for many industries. Alvey Conveyors.

Overhead Handling

6 Shows overhead monorail systems for transporting, lifting, and stacking or tiering. Photos show installations in many industries. All units—the rail, motor drives, carriers, cranes, etc.—are illustrated and fully described. Whiting Corp.

Overhead Conveyor

7 This booklet shows the "Zig-Zag" overhead powered conveyor. It's designed for sharp turns both horizontally and vertically. The track is a square tubular section. Bearing wheels in horizontal and vertical plane ride inside track. Well illustrated, diagrams of standard curves. Richards-Wilcox Mfg. Co.

Conveyor Chains

8 Two bulletins offered. First illustrates slat, scraper, drag, vertical, pusher, and extended pin conveyors. Diagrams and photos show the uses for which each is particularly well adapted. Tells you how to pick the right chain for your application. Second describes a new type of chain, which has a flat surface but can flex in both planes to take the sharpest turns or dips. Chain Belt Co.

Conveyors

9 This series of six bulletins shows gravity wheel conveyors, gravity roller conveyors, fixed and portable belt conveyors, a power-driven curved conveyor for joining two belts, and lightweight aluminum conveyors. Each is illustrated, gives complete engineering specifications. Harry J. Ferguson Co.

More on next page

DUPLICATE COUPON ON PAGE 312

MAIL THIS COUPON FOR FREE CATALOGS *(Good Until July 31, 1951)*

FACTORY MANAGEMENT & MAINTENANCE (May, 1951)
330 W. 42nd St., New York 18

I'm circling the numbers of the catalogs and bulletins I want:

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37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84
85	86	87	88	89	90						

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Townsend Acquires a New Division for Broader Service to You

When Townsend Company purchased the Cherry Rivet Company, two great names in the fastening industry were combined.

Townsend is the world's largest manufacturer of rivets and has specialized in wire drawing and cold heading during its 135-year history. The Townsend plants in the Pittsburgh and Chicago districts produce, in addition to rivets, a wide variety of special nails, self-tapping screws, locknuts, gadgets, small parts and other cold headed items. Sixty-million of these items can be produced every working day by Townsend.

Now, the experience and size of Townsend is being augmented by the special skills and manufacturing facilities of its Cherry Rivet Company Division in Los Angeles. These skills were developed in perfecting a blind rivet that could be installed from one side of the work without the necessity of "bucking up" as with standard rivets. Since its inception in 1937 the Cherry blind rivet has been used extensively in aircraft, railroad cars, buses, truck bodies, trailers and major appliances. The Cherry line includes blind rivets, blind bolts, drive pin rivets, lock bolts, utility rivets and special tools for installing them.

This merger brings you the benefit of combined manufacturing facilities plus the accumulated experience gained by both organizations in pioneering the solution of a multitude of fastening problems. All this adds up to better and broader service to you.

Townsend

COMPANY • ESTABLISHED 1816

Plants—New Brighton, Pa. Chicago 38, Ill.

Cherry Rivet Company Division, Los Angeles, California

Sales Offices in Principal Cities

We don't have to 'teach' our people how to use this extinguisher!

One glance tells you just how the Randolph operates—no instructions, no explanations necessary! That's why *anybody* can get a Randolph into action fast! No valves to turn, no nozzles to adjust; just point and press your thumb and Randolph's cloud of snowy CO_2 kills fire instantly!

Non-damaging Randolph CO_2 evaporates without a trace, is non-toxic, won't conduct electricity, deteriorate or freeze. And *all* Randolph Models are Underwriters' Approved.

A COMPLETE LINE OF EXTINGUISHERS AND AUTOMATIC SYSTEMS

Learn how Randolph gives your plant panic-proof, split-second protection against flammable liquid, electrical and other hard-to-handle fires! Write Randolph Laboratories, Inc.,4 E. Kinzie St., Chicago 11, Illinois.

Randolph SIMPLIFIED FIRE EQUIPMENT

Free NEW CATALOGS

Begins on page 282

Handling Equipment

10 Feature of this catalog is construction details of installations of gravity roller, belt, chain and wheel conveyors; automatic hoists and lifts, and spiral chutes. And two smaller bulletins describe in detail their line of gravity roller conveyors and wheel conveyors. Samuel Olsen Mfg. Co.

Conveyors

11 Bulletins on overhead chain conveyors, roller gravity conveyors, and barrel conveyors for the petroleum industry are offered. Each contains photos showing many varied installations, construction drawings, and engineering specifications. No. 2 contains a chart which tells you how wide a roller conveyor you need so that any size package can make the turns. Lamson Corp.

Belt Fasteners

12 Three different types of belt fasteners are shown in separate bulletins. Hinged and non-hinged, bolted-on fasteners, and hammered-on belt lacing is included. Each type is illustrated, sizes given, instructions for joining belts and repairing rips included. Flexible Steel Lacing Co.

Woven Wire Belts

13 A very complete (140-page) catalog on woven wire belt for conveyors. Pictures and descriptions of applications in many industries of this type belt. And there are sections on the construction of the various belts, how to choose the right metal for the belt, specifications for normal and high-temperature use, typical conveyor design, installation, and operation, and a section of useful engineering tables. The Cambridge Wire Cloth Co.

Package Handling Conveyors

14 Catalog shows belt conveyors in many sizes, for light or heavy duty, for horizontal conveying or elevating, for portable or permanent installation. Attachments shown include loader and discharge sections, hydraulic lifts for adjusting conveyor to any desired angle of elevation. A. B. Farquhar Co., Conveyor Div.

More on next page

From Receiving Room... to the End of the Line

Trane Heating Serves Everywhere in Industry

Here are just a few of the answers to heat-handling problems that factory engineers have found in the Trane line.

Production Line Heating—A manufacturer of dairy equipment uses Trane Projection Heaters and Louver Cone Diffusers to send warmth down from the ceiling all along a production line. The vertical unit heaters and their completely adjustable diffusers throw heat 60% farther than ordinary units and could be mounted higher, above craneways and overhead equipment.

Draft Prevention—A metal products plant had a negative pressure that caused infiltrating drafts. Trane Heating Coils installed in a window opening, built up a positive pressure which blocked the drafts, solved the problem, kept the building comfortable.

Drying—An eastern sugar refinery was looking for a quick, economical way to dry out the burlap bags that the raw sugar came in. A long drying tunnel, racks for the wet bags, and floods of heat from a Trane Torridor gave the answer.

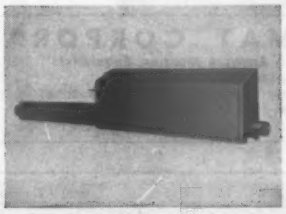
Supplying Cool Air—Forty autoclaves were generating a lot of heat in a North Carolina hosiery mill—too much heat. Trane Roof Ventilators were the answer. They draw cool air into the building as hot humid air is exhausted.

Perimeter Heating—An aircraft factory is usually a long building, and those long, drafty window areas were quite a heating headache to one western aircraft manufacturer. Trane Wall-Fin Heaters installed under windows blocked drafts, cut heat losses, cut the heating bill.

Whatever your factory heating, ventilating, cooling or air conditioning problem is, look for the answer in the Trane line.

Both Projection and Horizontal Unit Heaters with completely adjustable Diffusers, send heat in *any* or *many* directions at once.

This powered Roof Ventilator is a complete factory ventilating system. It can ventilate, circulate, heat both outside and recirculated air.



Easy-to-install Wall-Fin Heaters provide the ideal low-cost heating answer to window drafts and perimeter heating problems.

TRANE

MANUFACTURING ENGINEERS
OF HEATING, VENTILATING AND
AIR CONDITIONING EQUIPMENT

THE TRANE COMPANY, LA CROSSE, WIS.
Eastern Mfg. Division, Scranton, Pennsylvania
Trane Company of Canada, Ltd., . . . Toronto
OFFICES IN 80 U.S. and 10 CANADIAN CITIES

STORE CRUSHABLE and ODD-SHAPE MATERIALS

with the *Flexible* PALTIER

Self-Aligning Stacking Pallet

Palletizing SIDES OF LEATHER—a difficult material to handle, easily stored with the *Flexible* PALTIER.

RECEIVING CONE ASSEMBLY.
VERTICAL SUPPORT. Electrically welded mechanical steel tubing.
DIFFERENT LENGTHS OF VERTICAL SUPPORTS MAY BE USED WITH THE SAME PALLET FOR MORE FLEXIBLE AND EFFICIENT STORAGE.
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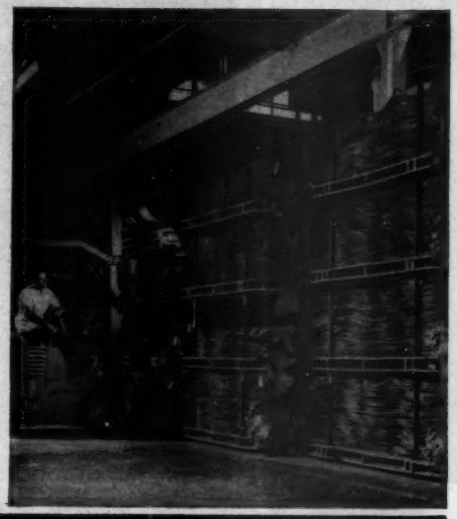
HEX LOCK NUT.
STEEL WASHER.
REINFORCING SLEEVE.
ALIGNMENT RING.
MALE CONE. WELDED TO SLEEVE.
PALLET



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INQUIRIES INVITED FROM DISTRIBUTORS AND DIRECT FACTORY REPRESENTATIVES

Free NEW CATALOGS

Begins on page 282

Steel Belt Conveyor

15 Steel belt conveyors illustrated in this catalog are equally suited to conveying sticky rubber out of a Banbury mixer and carrying food. Many applications of these conveyors are shown. Available in fixed or portable, level or inclined models. Attached bulletins on roller and wheel gravity conveyors. Steel-Parts Mfg. Co.

Belts

16 There's a special belt for every handling job. Bulletin lists best belt for general conveying, high-speed conveying, for cartons, live rollers, foodstuffs, hot materials, and other uses. Imperial Belting Co.

Belt Conveyor

17 Tables and charts in this 66-page booklet will help you with your conveyor problems. Gives you correct idler spacing for every belt width and load, recommended belt speeds, speeds and capacities for various weights of materials and width of belts, other useful information. Continental Gin Co.

Folding Conveyor

18 Series of bulletins describes the features and advantages of a folding conveyor, which elevates to any angle by hydraulic control (height changed safely even when in operation). Complete specifications and engineering data, available sizes, prices. Seedburo Equipment Co.

Conveyor Belts

19 Photos showing the belting in use under severe service conditions are the feature of these four bulletins. Gives results of comparative strength and impact tests, engineering tables to aid in calculating belt width and capacity. Raybestos-Manhattan, Inc.

Screw Conveyors

20 Recommendations for the correct screw conveyor for handling various materials from "Alum, lumpy" to "Zinc Oxide" are in this 40-pager. Tell you how to figure capacity, bearings needed, and horsepower required. Illustrated are screw conveyors of single, double, and triple flight; short or long pitch. Fort Worth Steel & Machinery Co.

More on next page

Lincoln EQUIPMENT

The Lincoln CentrOiler® System that Replaces the Oil Can.

An oil or grease must be applied to the bearing before it lubricates. Lincoln offers you a complete line of lubricating equipment for faster, cleaner, more positive application of any grease or oil to any bearing. The Line includes everything from the new Bullneck* Surface-Check grease fittings to a full range of Centralized Lubrication Systems.

Lever-Type Grease Guns
15 or 19 oz. capacity

Grease Fittings
(A Complete Range)

100 lb. Drum Pumps
(Air-Motor Operated)

Push-Type Grease Guns 9 or 15 oz. capacity

Powerluber®
(Air-Motor Operated)
60 lb. capacity
TWO WHEEL TRUCK AVAILABLE

400 lb. Drum Pumps
(Air-Motor Operated)

Centralized Lubricating Systems For One or Batteries of Machines.
(Illustrated, the New CentrOiler System for machines requiring periodic applications of oils.)

Bucket Pumps
30 lb. capacity

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LUBRICATING EQUIPMENT • • •

SEE OUR CATALOG IN SWEET'S

"Think of saving as well as of getting."

—Ben Franklin's Almanac, 1757

Scrap steel saved today can help steel products come thy way.

—Acme Steel Notebook, 1951

The current shortage of scrap steel makes the supply picture serious for all users of steel products.

Even before this scrap shortage faced the steel industry, increased civilian consumption and increased military needs made it impossible for Acme Steel to meet all the needs of all its 50,000 customers.

So save scrap steel. And, to make the best use of the Acme Steel products available to you, let your Acme Steel representative work with you on ways to increase efficiency, eliminate waste, maintain hard-to-replace equipment in your packaging, shipping and materials handling.

We will continue to help you—the way we have helped our customers for more than 71 years.

Save scrap steel today. *Get* more steel products tomorrow.

How you can help in the scrap drive.

1. Do a thorough housecleaning job in your shop. Collect all scrap steel, no matter how small.
2. Check your equipment now! Junk all machines worn out or broken beyond repair.
3. Ask your people to do the same job of housecleaning at home.
4. Sell your collection to a dealer in metal scrap. He will see it gets where it is needed.

ACME STEEL COMPANY

Dept. FM-51, 2838 Archer Avenue, Chicago 8, Illinois

To find out which of Acme Steel's 41 service offices in the United States and Canada is nearest you, check your telephone directory or write us.

ACME STEEL CO. CHICAGO

ACME STEEL

1951 is Acme Steel Company's 71st year of continuous operation, and the 50th consecutive year in which we have paid dividends to our stockholders.

ACME STEELSTRAP flat steel strapping and ACME UNIT-LOAD carload bracing BAND, SEALS and TOOLS • ACME SILVER-STITCHERS and ACME SILVERSTITCH WIRE for box stitching • ACME-MORRISON METAL STITCHERS and BOOK STITCHERS • ACME-CHAMPION BAG STITCHERS • ACME HOT AND COLD ROLLED STRIP STEEL • ACME GALVA-BOND steel slat stock for Venetian blinds • ACME STEEL SPECIALTIES, including hoops, corrugated fasteners, barbed box straps, nail-on strapping and other container reinforcements • ACME STEEL ACCESSORIES—snips, tool mounts, reel stands, coil holders, coil trays.

Free NEW CATALOGS

Begins on page 282

PNEUMATIC SYSTEMS

Pneumatic Dispatch Tubes

21 Two bulletins offered show how pneumatic dispatch tubes are being used in industry. Show tubes used to transport full-size blueprints and bulky papers; small tools, dies, and gages; hot samples from furnace to lab; and even gunpowder from bunker to loading machine. Typical tube layouts in many plants. Terminals and power units are described and pictured. Lamson Corp.

Pneumatic Conveying Systems

22 Two 24-page booklets are offered on the industrial applications of pneumatic conveying systems. Each pictures and describes many different uses: in cement plants, foundries, power-generating stations, soap plants, breweries—and plants having dry bulk material handling problems. There's a discussion of the cost savings, details of construction and operation. Fuller Co.

POWER TRUCKS
Lift and Nonlift

Trackmobile

23 Describes the Trackmobile—a 3-ton unit which can run on either road or railroad track. Has two sets of wheels: four railroad wheels, and four retractable rubber-tired road wheels. Bulletin is well illustrated, shows the many uses of the unit in any plant where there is railroad car movement—to switch, haul, and spot cars. Whiting Corp.

Fork Lift Trucks

24 A complete standard specification folder on a line of fork lift trucks, tractors, and electric pallet trucks. Data given for each model include capacity, load center, lift height, mast height, free lift, weight, tilt, turning radius, tires, engine, etc. Each model is illustrated. Towmotor Corp.

Lift Trucks

25 Lift trucks in capacities from 1000 to 3000 pounds are pictured and described in this booklet. Complete specifications for each model. And a section describes the operation of the hydraulically-actuated clutch mechanism. Transitier Truck Co.

More on next page

A "new dimension" in construction served by Georgia-Pacific

ANYBODY HERE SEEN KELLY?

If you haven't seen Kelly Field lately, you wouldn't know the place.

Things are roaring again down in San Antonio as America's most famous Air Force supply and maintenance depot swings back into action to help re-arm America. The U. S. needs air power fast, so naturally everything connected with getting Kelly Field back in fighting shape is ticketed "urgent."

That's why Billy Mitchell Village, a project of a thousand living units to house Kelly AFB personnel is being built with the help of Plywood. More than 1,500,000 square feet of Gum and Fir sheathing grade plywood from Georgia-Pacific's Savannah, Georgia, and Northwestern mills is being used in the sub-flooring, roof decking and sidewall sheathing. G-P Plywood, easy to handle and install, enables the contractor to use fabrication methods that cut construction time 15%, and practically eliminate expensive waste.

Top-quality Douglas Fir Plywood, and G-P hardwood plywood of all grades and sizes, manufactured to G-P's rigid standards of quality, are available to help you find new opportunities for time-saving economies and product improvements.

BUSINESS EXECUTIVES—*For a modern approach to plywood and lumber buying, write on your company letterhead for a copy of this 20-page full-color booklet, "A New Dimension," Georgia-Pacific Plywood Company, 608 North Capitol Way, Olympia, Washington.*

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PLYWOOD COMPANY

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DOUGLAS FIR PLYWOOD • HARDWOOD PLYWOOD • GPX • SOUTHERN & WESTERN LUMBER • DOORS

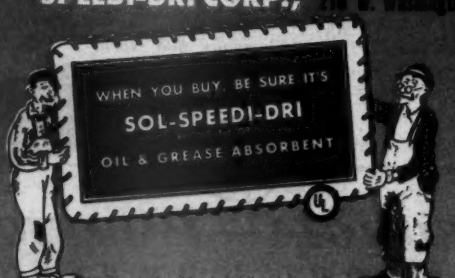
OUT OUR WAY
LOOK OUT! YOU YOUNG GUYS MAKE ME NERVOUS, GETTIN' SO CLOSE TO EXPOSED GEARS LIKE THAT!
HE LIKES TO RAZZ TH' YOUNG GENERATION ABOUT THEM HAVING TO PUT COVERS AN' SAFETY DEVICES ON EVERYTHING TO KEEP TH' BABES OUT OF DANGER!
BUT HE KNOWS TH' VALUE OF SAFETY! DIDN'T HE SEND FOR TH' SAMPLE OF SOL-SPEEDI-DRI?
SAFETY CONSCIOUS
J.R.WILLIAMS

First in sales—
because it's first in value

SOL·SPEEDI·DRI

Laboratory tests of many top companies—of independent experts—of our own—all prove that SOL-SPEEDI-DRI is first in value. No wonder, then, that it's America's largest selling oil and grease absorbent! Selected raw materials, careful processing, and laboratory controls keep SOL-SPEEDI-DRI quality always uniform. Send the coupon today for a free sample and brochure about how to keep *your* floors clean and slip-proof with SOL-SPEEDI-DRI.

SPEEDI-DRI CORP., 210 W. Washington Sq., Philadelphia 5, Pa.



Warehouse stocks maintained in principal cities of the United States and Canada.

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Inquiries in New York, New England, and New Jersey should write to Speedi-Sol Corp. Elsewhere in U.S. to Waverly Petroleum Products Co., 1724 Chestnut St., Phila. 3, Pa.

FREE SAMPLE: Fill out the coupon and mail today for big, free sample and brochure.

Name_____

Address_____

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FMM 5-51

Free NEW CATALOGS

Begins on page 282

Hand and Power Trucks

26 Illustrates a line of electric- and gas-powered fork lift trucks and hand trucks, available in capacities up to 10,000 pounds. Feature of the 26-page booklet is the descriptions of the automatic transmissions (no clutch) on both electric and gas trucks. Shows how attachments can make "many machines out of one." Complete specifications, dealer list. Clark Equipment Co.

Electric Trucks

27 The important mechanical and electrical features of this line of high- and low-lift electric trucks are given in a 26-page booklet. Each truck is pictured, and complete specifications—capacity, platform size, over-all dimensions, turning radius, lift height—are given. Wright Hibbard Industrial Electric Truck Co., Inc.

Pick-up and Fork Trucks

28 Three booklets offered—one each on gasoline fork trucks, electric fork trucks, and a 1-ton capacity pickup truck. Each is well illustrated; shows the equipment in action, gives important dimensions and engineering specifications. Complete line of handling accessories for fork trucks. Lewis-Shepard Products Inc.

Trucks

29 Electric, gasoline, gas-electric, and diesel fork lift trucks in many capacities and lift heights are pictured and described in this 46-page booklet. Also included is a complete line of hand trucks (power-driven), hand and electric hoists, and industrial scales. And over 20 accessories for the trucks—gripping forks, revolving forks, single and multiple drum handlers, shovel scoops, and others—are shown. The Yale & Towne Mfg. Co.

Fork Truck

30 Bulletin contains dimensional drawings showing the maneuverability of the truck, details, the amount of time necessary for maintaining. Specifications include capacity, speeds of travel and lift, controls, electrical and mechanical details. Pictures special attachments available. Baker Industrial Truck Div., Baker-Raulang Co.

More on next page

How to ZIP-UP a building!

Build it by *areas* instead of by *inches!* Use steel or aluminum Fenestra* "C" Panels! Just zip up your walls by interlocking these strong, simple sandwiches of metal and glass fibre insulation. You save time, labor, materials, money . . . your building is enclosed *fast* . . . and starts making money right away.

What's more, you can zip these walls apart and set 'em back up again farther out if you ever want to *expand* your building.

"C" Panels are light weight but tremendously strong and rigid. Only 3" thick . . . but with insulation value equal to that of a 12"-thick brick wall.† Incombustible. So smooth that dirt and grease can't get a grip.

They're another Standardized Fenestra Product engineered to cut the waste out of building (and maintenance).

And you can get *quick* delivery!

A Few Details on Fenestra "C" Panels

Size: Standardized 3" deep, 16" wide, 6' to 12' long, 18 gage painted steel or 16 B&W gage aluminum (or combination). Steel panels weigh only 6.50 lbs. per sq. ft. Aluminum 3 lbs.

Elements: Made from two formed members joined into a structural, vapor-sealed unit. Asphaltic impregnated felt is inserted inside full length between members and end closures to prevent metal-to-metal contact. Packed with glass fibre insulation. Double tongue and groove joints give three positive bearing surfaces per panel, making wall of vertical "C" Panels an integral unit.

For full information on specifications, performance data, installation details, delivery schedules, etc., call your Fenestra Representative today (he's listed in your phone book) or mail the coupon.

*Trademark

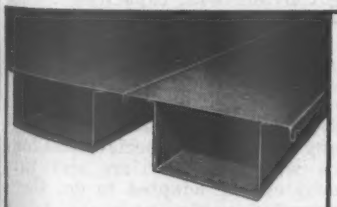
†This difference in thickness will give you 602 sq. ft. more floor space in a 150' x 250' plant!

"C" Panel Walls of The Kansas Power and Light Company, Hutchinson. Both steel and aluminum and "combination" panels were used. *Architect:* Black & Veatch, Kansas City.

Fenestra

PANELS • DOOR • WINDOWS

Engineered to cut the waste out of building



"D" Panels for smooth strong floors and long-span roofs. Standard width 16". Depth 1½" to 7½". Gages 18 to 12.

Acoustical "AD" Panels for combination ceiling, silencer, roof. Standard width 16". Depth 3" to 7½". Gages 16 to 13.

DETROIT STEEL PRODUCTS COMPANY
Building Panels Division
Dept. FM-5, 2266 E. Grand Boulevard
Detroit 11, Michigan

Please send me, without obligation, information on Fenestra Building Panels.

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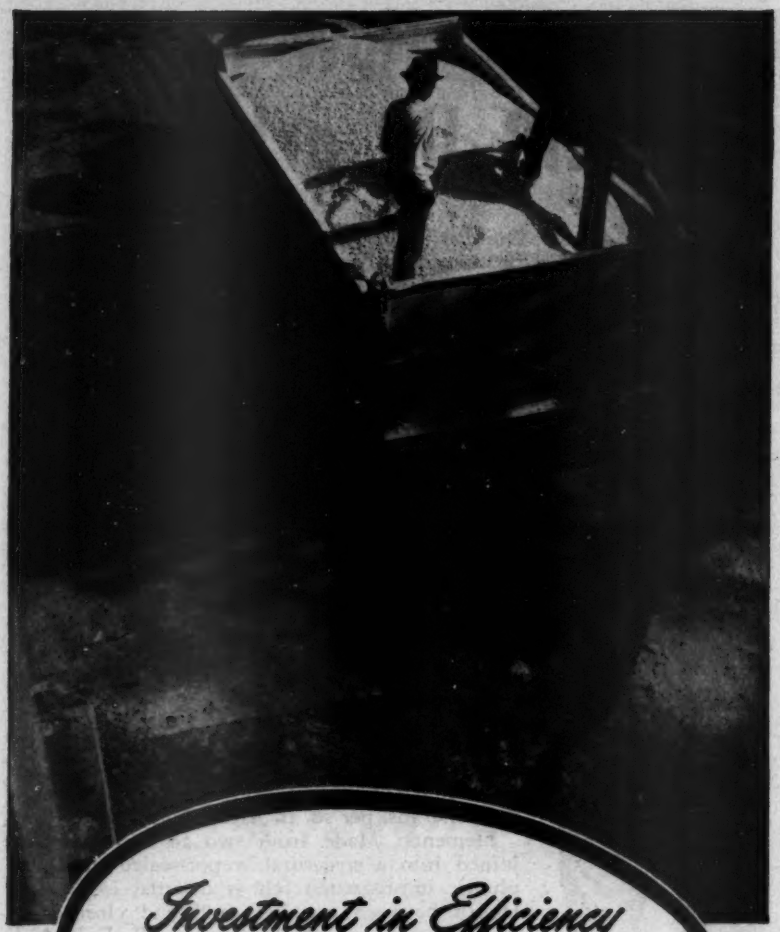

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PNEUMATIC CONVEYORS

One of the most profitable investments modern-day manufacturers can make is top-efficiency materials-handling equipment.

And one of the best investments you can make for handling granular bulk materials in your manufacturing operations is DRACCO PNEUMATIC CONVEYORS.

They will reduce your labor costs in two important ways—first, they require less manpower, and second, they do the job faster. They also transport materials horizontally or vertically, underground or overhead, without "stealing" valuable manufacturing space.

Completely enclosed, DRACCO PNEUMATIC systems eliminate dust hazards, contamination, and loss of materials.

DRACCO engineers, with over 35 years' experience in reducing materials-handling costs, will gladly show you how your investment in DRACCO PNEUMATIC CONVEYORS will pay production dividends. Call or write to DRACCO CORPORATION, 4063 E. 116th Street, Cleveland 5, Ohio, 415 Lexington Avenue, New York 17, N. Y.

DRACCO PNEUMATIC CONVEYORS

DUST CONTROL EQUIPMENT • METAL FABRICATION

Free NEW CATALOGS

Begins on page 282

Fork Lift Trucks

31 A "stand-up" and a "sit-down" type fork lift truck are described in two bulletins. Drawings and pictures show mechanical and operating features. Include specifications. Mobilift Corp.

Tractors and Coal Storage

32 The story of economical and efficient coal storage for industrial purposes, using tractor-scraper combinations or bulldozers, is told in this bulletin. Shows how to pile coal correctly, the best ways of handling. Also illustrates their line of tractors, graders, and tractor accessories. Allis-Chalmers.

Fork Lift Truck

33 Bulletin describes their "Jeep" for lift truck. Gives performance data, capacity, electrical and mechanical specifications, safety devices, and lubrication. Diagrams illustrate over-all dimensions, turning radius, lift, and tilt. Mercury Mfg. Co.

Speed Truck

34 Pictures and diagrams show the features of a platform truck that can carry 3500 lb. Deck loading area of 20 sq. ft.; speeds to 15 mph.; turning radius, 64 inches. Kalamazoo Mfg. Co.

Universal Loaders

35 Loaders for handling almost any material are shown in this catalog. In both tilting-tower and standard models, the loaders can be equipped with attachments for many materials handling jobs. They include: material buckets, coal and snow bucket, lifting fork, combination bulldozer, angle-dozer, snow plow, and crane. Lull Mfg. Co.

Carriers and Lift Trucks

36 Carriers with capacities up to 15 tons, and fork lift trucks with capacities up to nine tons are described in two booklets. Both well illustrated, show the equipment in action, illustrate all operating and mechanical features. Many examples of special handling jobs which the carriers and lift trucks can be adapted to do. Gerlinger Carrier Co.

More on next page

Udylite Automatic Loader and Unloader shown as used in processing pistons for automobile engines.

ANOTHER UDYLITE CONTRIBUTION TO LOWER PLATING COSTS...

Here's your answer to the increasing production costs in electro-plating—the new Udylite Automatic Loader & Unloader. This completely automatic hydraulic unit provides a vital link in the processing and metal finishing chain. The Loader conveys work racks automatically from the racking station to the plating machine and loads the racks on the plating unit mechanically—eliminating the labor ordinarily required for transporting work, loading and unloading.

Consider *all* these advantages:

1—The Udylite Loader can be used on a large machine or it can be used as an intermediary between two small machines where the plating cycle is split.

2—It can be added to an existing automatic plating machine in the field or it can be ordered as optional equipment on a new machine.

3—Although the Loader is hydraulically-driven, it can be used with either hydraulic or air-operated plating machines.

4—Plating machines equipped with the Loader can be operated independently, since a separate hydraulic circuit is built into each Loader.

Let your nearby Udylite Technical Man give you the complete story about this new Udylite development to *Better Your Way of Plating*. Call him today or write direct to *The Udylite Corporation, Detroit 11, Michigan*. There's no obligation.

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

FOUR WAYS
to get results
in faster, lower-cost handling

1 WITH ROLLER AND BELT CONVEYORS

— keep cases, cartons, packages, parts moving — better, faster, cheaper — on Standard gravity or power roller or belt conveyors. We plan and build efficient equipment for any handling need — designed to fit your particular needs — cut your handling cost.

2 with a HANDIPILER

—a portable self-contained conveyor unit. Stacks up to 17 ft. — handles up to 135 lbs. packages — saves time and manpower in storage and shipping rooms.

3 with an INCLINEBELT

— lifts and lowers packages from floor to floor continuously and automatically. Available to meet elevations 8 ft. to 14½ ft. inclusive; handles commodities up to 25½ inches wide.

4 with PNEUMATIC TUBE SYSTEMS

— provide swift, sure, safe transportation of messages, documents, blueprints, samples, small parts, money; cylindrical or oval tubes 1½ inch upward with dispatching and receiving terminals for complete systems to meet your needs. Write for special bulletin SPT.

Write for Standard's general Catalog FM-51. Tell us what you want to handle or name equipment on which you want more information.

STANDARD CONVEYOR COMPANY
North St. Paul 9, Minn.
Sales and Service in Principal Cities

Standard GRAVITY & POWER CONVEYORS

NEW Free CATALOGS

Begins on page 282

'Liftruk'

37 Bulletin describes fork lift truck available in 5, 7½, and 10-ton capacity. All dimensions shown in diagram. Attachments (boom, ram, and crane) are available. Full specifications. Silent Hoist & Crane Co.

Carriers and Fork Lift Trucks

38 Three catalogs and a series of bulletins offered show carriers and fork lift trucks in all capacities. Catalogs are well illustrated, show the many different kinds of materials handling jobs for which the equipment is suited. Catalogs contain handy tables for determining the carrier or lift truck you need, depending on loads, maneuvering area, and road speed required. The Ross Carrier Co.

Straddle Trucks

39 Straddle trucks for handling lumber, angle iron, heavy fixtures, steel pipe, other long, bulky loads. Construction details described and illustrated. For each truck, there's a diagram and chart giving complete dimensions, load capacities, and weights. And optional accessories are listed. Hyster Co.

Electric Trucks

40 Electric-powered hand pallet and platform trucks, stacking trucks, heavy-duty fork and ram trucks (up to 80,000-lb. capacity), low-lift and high-lift platform power trucks are all shown and described in this catalog. Complete line of accessories (revolving paper roll clamp, pushers, crane, clamping devices, etc.). Automatic Transportation Co.

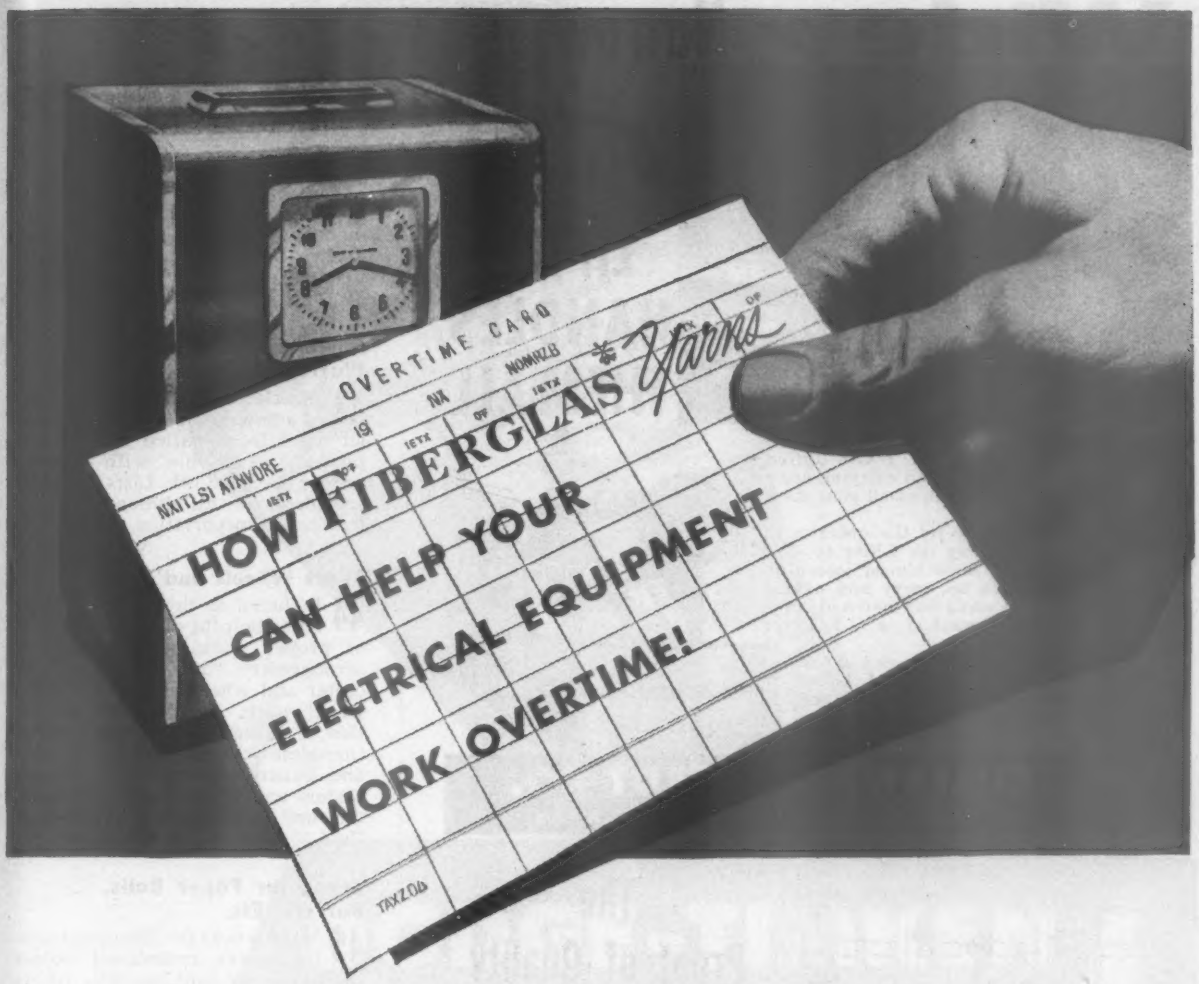
Materials Handling Equipment

41 Series of bulletins bound in folder offered. Include data on fork lift trucks in all sizes, industrial shop trucks (platform), industrial tractors, and jacks. All are illustrated, full engineering data. The Buda Co.

HAND TRUCKS
Power-Driven and Manual

Hand Lift and Pallet Trucks

42 Feature of this catalog is photos showing the many different types of loads that can be transported by this line of hand trucks. And there's a section on recom-



In these days of serious national effort, your electrical equipment must work overtime to meet increasing civilian and military demands. Equipment will run longer, more efficiently, without breakdown if you:

- **Specify Fiberglas electrical insulations in the new equipment you buy.**
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Why Fiberglas? Because tough, long-lasting Fiberglas insulating materials resist heat and overloads, deliver superior service.

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1 C-F LIFTER HANDLES THEM ALL

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

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Bulletin SL-25 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

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Free NEW CATALOGS

Begins on page 282

mended pallet design. Also shows electric-powered hand trucks and fork trucks. The Yale & Towne Mfg. Co.

Powered Pallet and Platform Trucks

43 Booklet describes the features of a powered platform and pallet hand truck called the "Transporter." Available with electric or foot-operated lift. Lists complete specifications, all dimensions. Automatic Transportation Co.

Truck Wheels and Casters

44 Included in this 42-page booklet is helpful data on selection of proper wheel and caster unit arrangement, "do's and don'ts" for caster and wheel users, caster and wheel parts identification, definition of terms used in the catalog. Complete description, specifications, and illustrations of a line of truck casters and wheels for light, medium, and heavy duty. Divine Bros. Co.

Truck for Paper Rolls, Barrels, Etc.

45 Hand trucks for lifting and moving heavy cylindrical object, such as paper rolls, barrels, drums, reels, and coils, are illustrated in bulletin. Can handle loads up to 2000 lb. Dimensions and specifications. Second folder describes a line of skid platforms, pallet boxes, floor trucks, and lift jacks. Ironbound Box & Lumber Co.

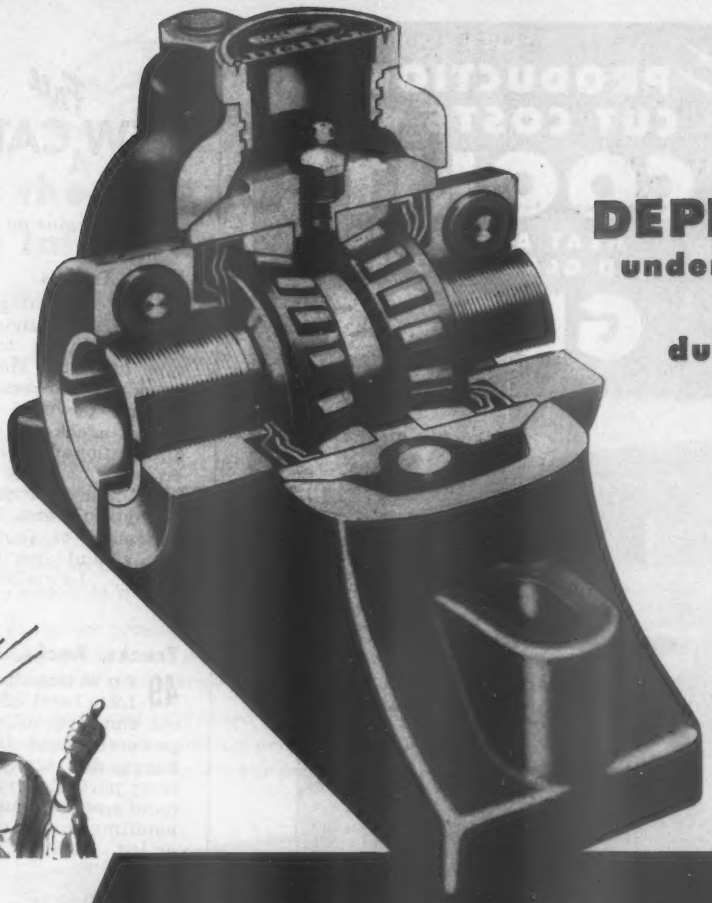
Casters and Trucks

46 Catalog contains information on selection of casters (depending on weight of load, floor, and operating conditions), choice of caster combinations (rigid and swivel), and practical mountings; and a handy selector index chart. Shows complete line of casters and floor locks, platform and stock trucks. Well illustrated. The Rapids-Standard Co., Inc.

Hand Trucks

47 Bulletin gives pictures of 50 standard and special-purpose hand trucks which are available for transporting almost any material, any shape container. Designs available for hundreds of other models. All Steel Welded Truck Co.

More on next page



DEPENDABLE
under severest conditions of dust and dirt!

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- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16" to 4-15/16".

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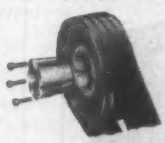
DODGE

of Mishawaka, Ind.

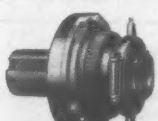
CALL THE TRANSMISSIONEER, your local Dodge Distributor for assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCERS



ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO, ILLINOIS

Speed PRODUCTION . . . CUT COSTS with COOLITE HEAT ABSORBING AND GLARE REDUCING GLASS

Coolite, Glare Reduced, installed in District Manufacturing and Repair plant of Westinghouse Electric Corporation, St. Louis, Missouri

Whether used in new construction, modernization or for sash replacement the installation of Coolite, Heat Absorbing and Glare Reducing Glass is an investment in greater production and decreased maintenance cost.

Blinding sun rays that cause eye fatigue and lead to inefficiency and production declines are turned aside or absorbed by glare reducing Coolite glass.

Glare reducing Coolite admits only softly diffused comfortable daylight . . . reduces solar heat transmission and lightens the load on air conditioning equipment. Temperatures inside are lower . . . working conditions are improved. Eliminated are painted glass, makeshift shields and bothersome blinds. For details mail the coupon for free catalog, "Coolite Heat Absorbing and Glare Reducing Glass."

SEE OUR CATALOG IN SWEET'S

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WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

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Please send me a copy of your free catalog on Coolite, Heat Absorbing and Glare Reducing Glass.

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Free NEW CATALOGS

Begins on page 282

Hand Trucks

48 Three catalogs offered. First describes an electric-powered platform truck for handling any type of pallet, and an electric lift truck and stacker. Second describes electric-powered and manual-operated stackers, geared winches, and stationary working-height lifters which can be adapted for use with many production machines. Third illustrates hand trucks with hydraulic or foot lift, skid platforms, and special-purpose hand trucks. Lewis-Shepard Products Inc.

Trucks, Racks, and Hoists

49 An 88-page, pocket-size catalog. Lists hand lift trucks, mechanical and hydraulic action; electric-powered hand trucks; skids and boxes; dial scales; portable elevators; portable cranes, electric and hand powered, and other materials handling equipment. Includes dealer list. Barrett-Cravens Co.

Hand Trucks

50 Catalog gives description and illustrates a line of barrel trucks, barrel and box skids, hand shovel and dump trucks, a barrel lift and stand, bag trucks, platform trucks, dollies, shelf trucks, and rubber-tired and solid wheels. Complete specifications—available sizes, dimensions, wheel type, and capacity. Modern Equipment Co., Inc.

Powered Hand Trucks

51 Hand trucks available in electric-driven or gasoline-hydraulic driven models are described in catalog. The features, and the electrical and mechanical details of the trucks are given and illustrated. Dealer list included. Clark Equipment Co.

SKIDS, PALLETS, BOXES

Stacking Pallet

52 Illustrates how many hard-to-palletize materials (tires, hides) can be tiered by use of self-aligning stacking pallets. Shows construction of the pallets, how they are disassembled for compact storage, available types (two- and four-way entry, with and without cover plates). The Paltier Corp.

More on next page

Century

Serves the Electric Motor User in Two Important Ways:

1. Century motors are designed and constructed for a long, dependable operating life.

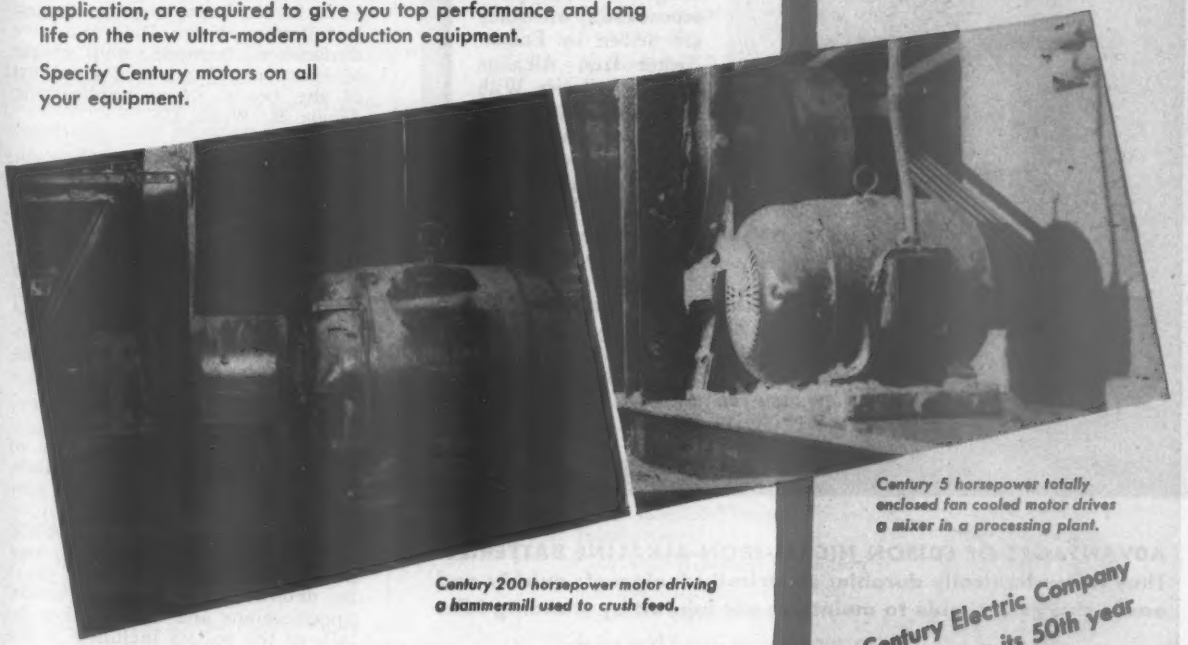
2. Just as important—they are skillfully selected to match the operating characteristics of the many kinds of equipment they drive.

IN CENTURY'S wide range of types and sizes (up to 400 H.P.) there are available: 4 standard classes of starting torque characteristics—6 methods of speed control—constant and short time ratings—4 basic classes of frame protection against atmospheric hazards—a dozen methods of mounting the motor to the equipment—plus many special specifications to meet the requirements of the BIG NAME equipment manufacturers who use Century motors as a component part of their equipment.

Teamwork with equipment producers gives you skillfully selected motors from Century's wide range of types and sizes... properly applied to match the performance characteristics of the machines they drive.

Both a properly designed and constructed motor, plus skillful application, are required to give you top performance and long life on the new ultra-modern production equipment.

Specify Century motors on all your equipment.



Century 200 horsepower motor driving a hammermill used to crush feed.

Century 5 horsepower totally enclosed fan cooled motor drives a mixer in a processing plant.

Century Electric Company is celebrating its 50th year in the electrical industry

Century SERVICE Is Near Any CENTURY Motor Driven Equipment

Prompt Service is offered by CENTURY'S National Network of more than 200 Authorized Service Stations, supervised by 28 Century Sales offices.

1. Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.
2. CENTURY Authorized Service Stations are qualified and equipped to service and repair any piece of CENTURY apparatus.
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CENTURY ELECTRIC CO.

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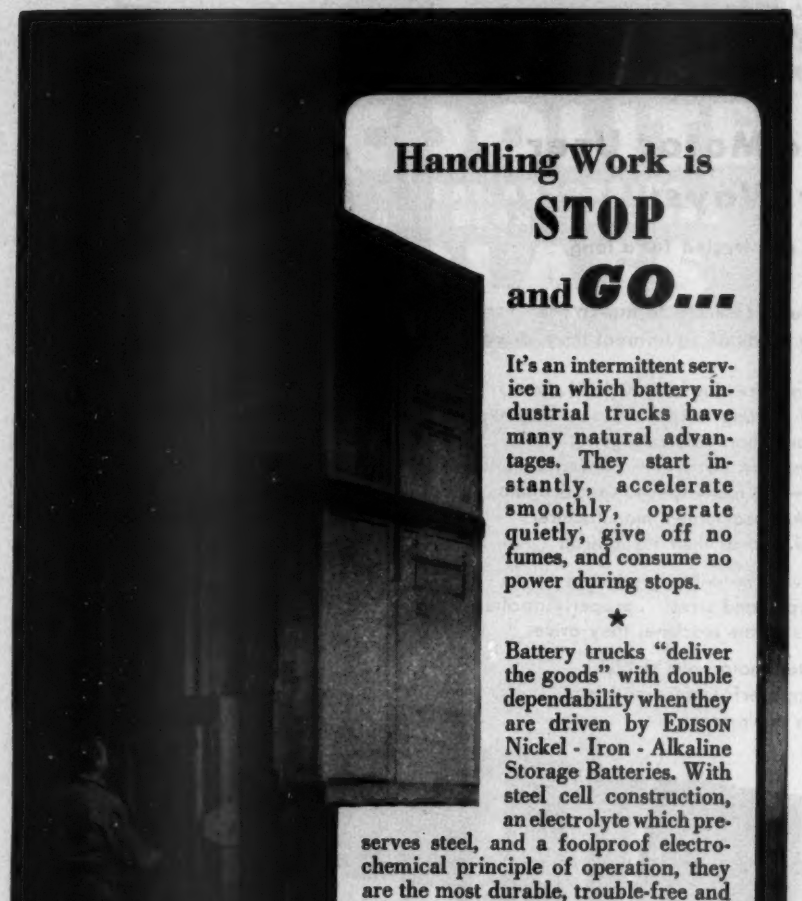
Offices and Stock Points in Principal Cities

Century C MOTORS

709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STOP
and GO...
It's an intermittent service in which battery industrial trucks have many natural advantages. They start instantly, accelerate smoothly, operate quietly, give off no fumes, and consume no power during stops.
★
Battery trucks "deliver the goods" with double dependability when they are driven by EDISON Nickel - Iron - Alkaline Storage Batteries. With steel cell construction, an electrolyte which preserves steel, and a foolproof electrochemical principle of operation, they are the most durable, trouble-free and long-lived of all batteries.
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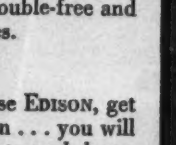
If you do not already use EDISON, get a current price quotation . . . you will probably find initial cost *much lower than you think*; annual operating cost *less than you pay now!*

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION

of Thomas A. Edison, Incorporated, West Orange, N. J.

In Canada: International Equipment Co., Ltd., Montreal and Toronto

Free NEW CATALOGS

Begins on page 282

Skids and Pallets

53 Shows skids, pallets, skid boxes, manually operated hand trucks, platform trailers, bridge plates, hoppers and end dumps, and special purpose racks. Basically a catalog to show what's available, many pieces of equipment are pictured for handling almost any material or package. Fab-Weld Corp.

Knock-Down Materials Handling Box

54 Describes a knock-down handling box that can be used for many purposes. Nesting feature permits stacking up to six loaded boxes safely, eliminates load binders. Eight-way access for lift truck. When knocked down, 70 boxes can be loaded in the same trailer space as 28 loaded boxes require. Typical installation photos. Diagrams give dimensions, capacity, and weight of the available sizes. Partial list of the boxes' many applications. Jervis B. Webb Co.

Pallet Stacker Unit

55 Pallet stacker units—pallets with collapsible, upright arms for supporting other pallets on top—are described in this bulletin. Photos show how units are suited for the storage and transport of odd-shaped materials, such as cement bags, rolls of paper, etc. Complete specifications and dimensions. Elizabeth Iron Works.

Shipping Pallets

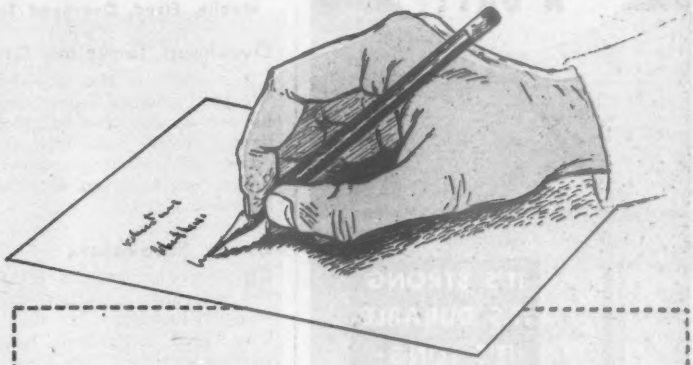
56 Bulletin describes a line of "Zeferwate" wooden pallets, available in standard sizes or sizes to fit individual loading requirements. Gives reasons for adopting pallets, shows typical unit load patterns, and includes check chart for determining your pallet needs. Specifications and construction details of the pallets included. Acme Pallet Co., Inc., Engineering Section.

Cloth Tape

57 Folder describes a line of cloth tapes for either permanent packaging or temporary sealing and holding jobs. Plastic-coated tapes give maximum protection against deteriorating elements. Adhesive, leaves no residue or marks. Mystic Adhesive Products.

More on next page

STOP... LOOK...and LIST' EM!



...There may be several types of products that you need in this list of FLINTKOTE materials

Surely, there's at least *one* place in your plant or processes where materials listed on this page can serve you . . . and serve you *better*.

Maybe it's an improved kind of saturant you need. A new adhesive. Or a sizing . . . a protective coating . . . a mastic flooring emulsion . . . or products for waterproofing or dampproofing. The FLINTKOTE Line includes them all . . . and *more*. They're all *quality* products . . . all FLINTKOTE-made.

Maybe you're looking for a *brand new* product. One that improves your plant protection or your manufacturing processes. A *tailor-made* one—that no one else has been able to give you. Our research staff will be glad to help you develop it.

You can get a finished product . . . or one to use as a component in your own formulations.

We manufacture in volume . . . with plants from coast to coast.

So read the list at the right—make *your own* list—and send it to us for complete information, specifications and prices. No obligation, of course—and you'll be mighty glad to have FLINTKOTE as another reliable source of supply.

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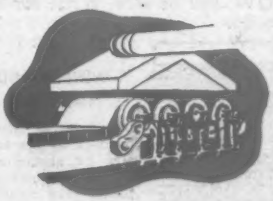
- Synthetic Rubber and Resin Compounds
- Rubber and Resin Water Dispersions
- Asphalt Tile Cements

SATURANTS and SIZINGS



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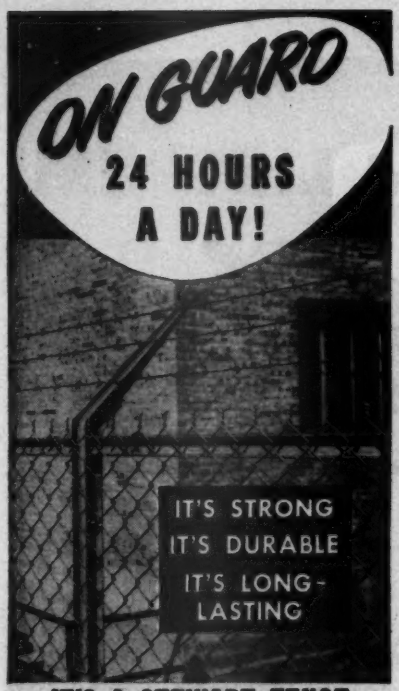
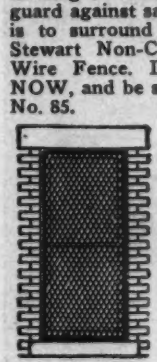
- Joint and Crack Sealers—hot and cold applied
- Asphalt Base Aluminum Paint

FLINTKOTE
Products for Industry



IT'S A STEWART FENCE

These are dangerous days! Don't take chances! If your industrial property is not adequately protected you are inviting trouble. The one sure way to guard against sabotage and vandalism is to surround the property with a Stewart Non-Climbable Chain Link Wire Fence. Don't delay—FENCE NOW, and be safe. Write for catalog No. 85.



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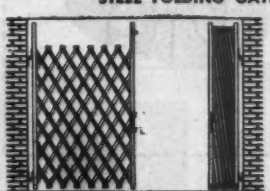
(Wire or Iron)

Made with round or channel frames to fit any size or shape opening. When requesting prices please give measurements and send diagrammatic sketch.

WIRE MESH PARTITIONS—Sectional

Fit any height or width. Easily and quickly erected. When writing for prices please give all measurements involved.

STEEL FOLDING GATES



Made in single or double gate construction to fit any width opening. Prices on request. Please give width and height of opening.

THE STEWART IRON WORKS CO., INC.
1856 Stewart Block Cincinnati 1, Ohio

Stewart IRON and WIRE FENCES

Free NEW CATALOGS

Begins on page 282

CRANES
Mobile, Fixed, Overhead Traveling

Overhead Traveling Cranes

58 Feature of this booklet is photos showing each major component—crane trolley, hook block, bridge drives, cab, etc.—of typical overhead traveling cranes. Installations are pictured. Reading Chain & Block Corp.

Crane Excavators

59 Crane excavators in three models—crawler, truck, and wagon—are illustrated in this catalog. The ½-yd. excavators have lifting capacities up to 12½ tons, gasoline or diesel power. Attachments for converting to shovel, dragline, clamshell, trench hoe, pile driver, and magnet shown. American Steel Dredge Co., Inc.

Excavator-Crane

60 Shovel, backhoe, dragline clamshell, bulldozer, and crane attachments for track-type tractors are shown in this 16-page booklet. Complete specific working dimensions, estimated tool production for various classes of material (sand, common earth, well-blasted rock, etc.) Well illustrated with photos and diagrams. Hyster Co.

Mobile Cranes

61 Contains many photos showing this line of mobile cranes at work in many different industries. Special features described and illustrated. Cranes in capacities from 2750 lb. to 46,000 lb. are shown, full specifications given. Coles Cranes, Inc.

Boom Crane Assemblies

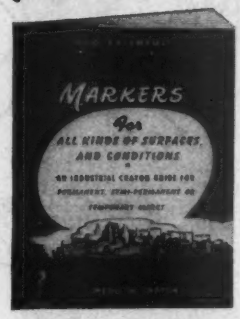
62 Bulletin shows advantages of this line of boom crane wire assemblies. Splices and special fittings resist fatigue, distribute load uniformly, have full breaking strength of wire rope used. Comparative analysis with other assemblies. American Chain & Cable Co., Inc., Wire Rope Sling Dept.

Cranes and Monorails

63 Illustrated are motorized overhead cranes, hand operated cranes, jib cranes, monorails, and a line of accessories—switches and turntables, crane end trucks, electric hoists, storage racks. Each is fully described, specifications given. Abell-Howe Co.

More on next page

Your Guide to Better *Product Identification*



This FREE "MARK IT" MANUAL

Tells and shows in actual use, the marker to use on every surface—METAL, WOOD, PAPER, GLASS, LEATHER, RUBBER, TEXTILES—for every surface condition—HOT, COLD, OILY, ROUGH, GLAZED, COATED.

If there's a product to be identified, there's an American Marker to do the job better! American-Old Faithful Markers are *specialized*—made by marking specialists with over 100 years' experience.

SEND TODAY! Dept. F-43

american crayon company

THE *Jacques* SEMI-AUTOMATIC
POWER SHEAR

For the quick, accurate cutting of materials from rolls or sheets with hand or electronic controls.

Write today for new descriptive folder showing features and applications.

EST 1882

HOBBS MANUFACTURING CO.
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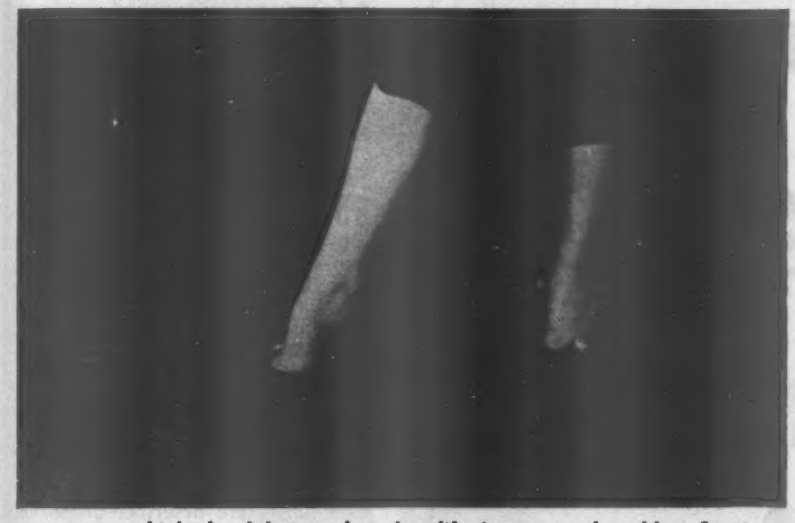
Manufacturers of:
JACQUES Hand and Power Shears, Slitters and Rewinders, **TRI-POWER** Die Presses, **HOBLOK** and **LOXIT** Cotter Pins, **TANGLEPROOF** Lock Washers.

HOW TO IMPROVE YOUR FLOORS WITH KWYKWAX



GLOSS — a high, hard luster — breathes life into even the oldest flooring. Kwykwax produced a rich-looking sheen on this well battered linoleum *without buffing or polishing* . . . and new floors respond like magic! A deep, long-lasting gloss that will not darken wood or other surfaces. After heavy traffic wear, a light buffing brings back new, brighter sparkle.

APPEARANCE and application go hand in hand. Kwykwax spreads on smoothly and easily. Without lapping or streaking. A non-tacky finish means floors *stay* cleaner.

HARDNESS can be easily tested. Ask a West representative to coat a standard test sheet with your present wax—and Kwykwax. Scratch both with the edge of a coin. You judge!

PROTECTION saves floor repair. Kwykwax resists hot and cold water. Won't spot or peel . . . even after long, "rainy day" exposure. Repeated application restores worn floors.

SAFETY is only good business sense. So too is Kwykwax, listed by the Underwriters' Laboratories as an anti-slip floor treatment. Ask the ladies — soon as your floors are Kwykwaxed!

ECONOMY here can mean extra profits. There's 1500 to 2000 sq. ft. of coverage in every gallon of Kwykwax! Squeeze it out . . . the thinner the coating the better.

An independent survey* proves it! Recently, field and laboratory tests were conducted without favoritism on a wide range of flooring materials. At the request of a well-known association. Of 26 water-emulsion waxes tested, only Kwykwax earned a triple top rating in the three main classifications: Gloss . . . mar-resistance . . . water-resistance. Kwykwax surpassed a number of higher-priced competitors! Prove it to your own satisfaction. Compare your present wax with a test sample of Kwykwax. For a free sample write Dept. 3.

Ask your West representative for a copy of this wax evaluation report.

WEST DISINFECTING Company

42-16 West Street, Long Island City 1, N. Y.
(64 Branches in the U. S. and Canada)

NEW!

READY-POWER

Diesel-electric units

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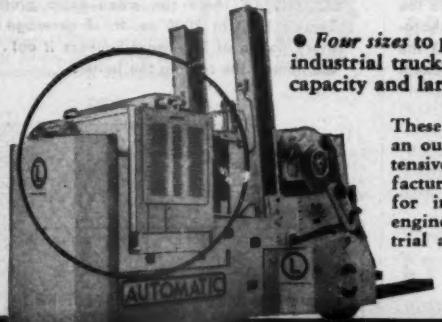
• Featuring amazingly low-cost operation, long life and reduced maintenance.



• *Four sizes* to power electric industrial trucks of 6,000 lb. capacity and larger.

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The READY-POWER Co.

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Free NEW CATALOGS

Begins on page 282

Cranes and Hoists

64 Overhead traveling cranes, both electric and hand-powered, jib cranes, and spur-geared hoists are illustrated and described in this bulletin. Features of each model, specifications given. Conco Engineering Works.

Torque Hooks

65 The operation of torque hooks, designed for easy, fast, and safe lifting and handling of steel sections and beams is pictured and described in bulletin. Includes test reports on strength of hooks. Many applications pictured. Elizabeth Iron Works.

LIFTS AND HOISTS

Chain and Electric Hoists

66 Multiple gear, screw gear, and differential chain hoists; ball bearing trolleys; and electric-powered hoists are described in three booklets offered. The hand hoists are shown in a 38-pager. Full specifications, handy section on how to select the correct chain hoist for your operation. Other two give full particulars on electric hoists, describe a 'unit construction plan' by which standard components can be built up into any one of the 144 different hoists to meet any plant need. Reading Chain & Block Corp.

Hoists and Trolleys

67 Shown in catalog are spur-geared hoists in capacities up to 25 tons, extended hand wheel hoists (which permit operator to stand at a distance from the load), twin hook hoists, trolley hoists, differential hoists, and trolleys. Contains parts lists, maintenance and operating instructions, description of operating principles. The National Screw & Mfg. Co., Chester Hoist Div.

Hydraulic Lifts

68 Hydraulic lifts, called "Oil-Lifts," are discussed in this 20-page catalog. Explains hydraulic lift principle, the five types of power cylinders available, and the various control units. Includes loading lifts, ramp eliminators, platform lift for widely separated levels, machine feeding lifts, bridge lifts (for spanning recessed railroad track), and many other applications. Sections on selecting correct lift for your requirement. Globe Hoist Co.

More on next page

ERIEZ MAGNETIC ATTRACTIONS

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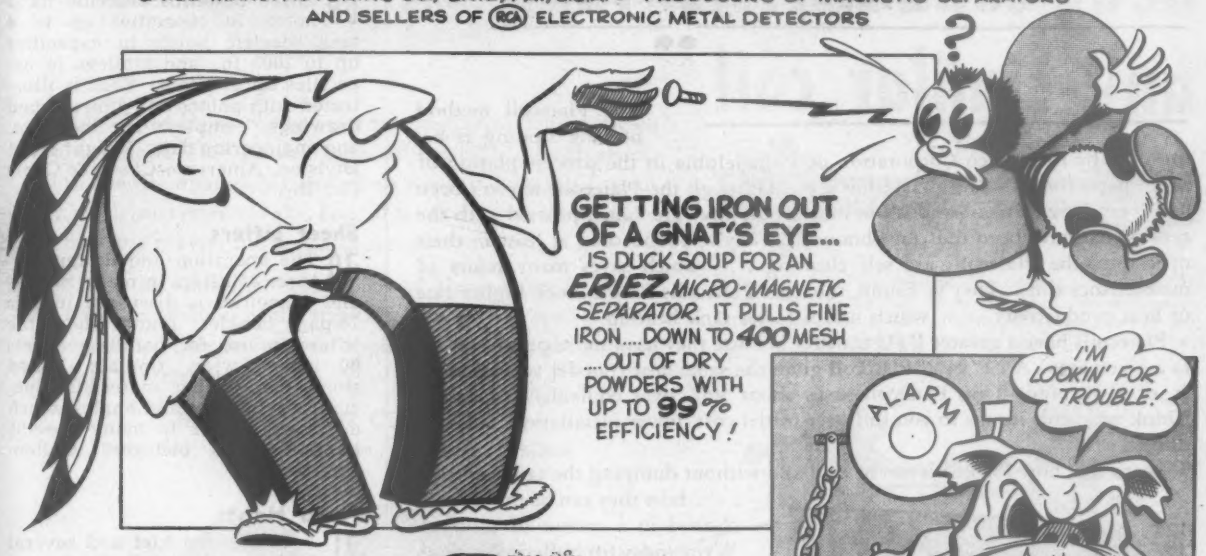

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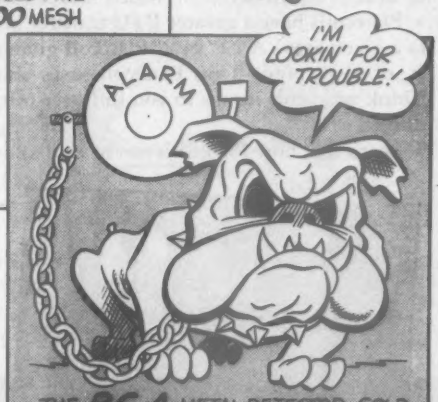

THE *R.C.A.* METAL DETECTOR, SOLD BY *ERIEZ*, IS AN **ELECTRONIC WATCHDOG** THAT SPOTS ANY KIND OF METAL IN ANY KIND OF NON-METALLIC MATERIAL OR PACKAGE. WARNS BY GONG OR LIGHT, OR REMOVES THE CONTAMINATED PACKAGE .... *AUTOMATICALLY!*

RECOVERY OF EXPENSIVE TOOLS WITH AN *ERIEZ* **ATOM**AGNET PULLEY PAID FOR THE UNIT IN A YEAR. THE PULLEY AUTOMATICALLY CLEANS IRON AND STEEL FROM MATERIALS BEING CONVEYED ON BELTS.

AN *ERIEZ* PLATE-TYPE **ATOM**AGNET HAS MAGNETICALLY LIFTED A CIGARETTE WEIGHING *447* TIMES MORE THAN THE FERROUS PARTICLE HIDDEN IN IT! ....RESULTS ARE JUST AS STARTLING WITH OTHER PRODUCTS.

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51 E

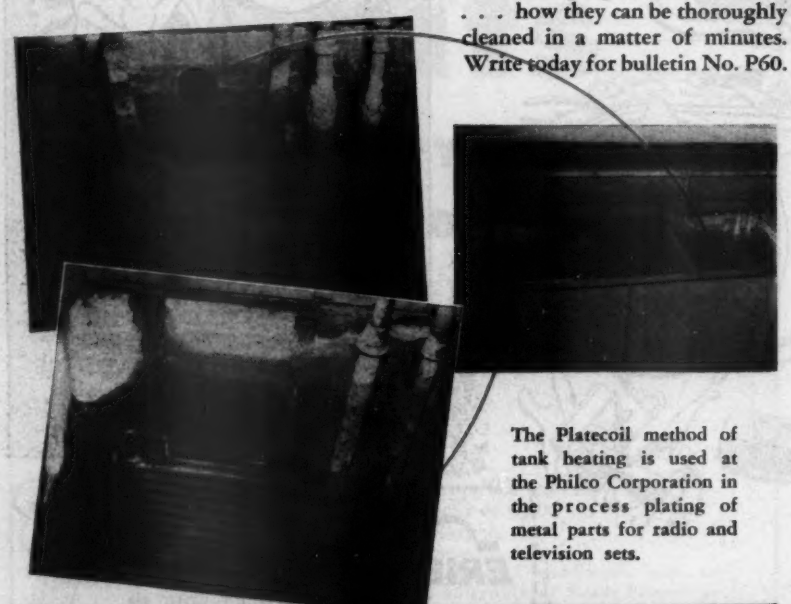
PHILCO finds

"platecoils have better heat conductivity than any similar coil"

The Platecoil method of tank heating is being used by the Philco Corporation of Philadelphia in the process plating of metal parts for radio and television sets. Although the Platecoils haven't been used very long, Philco production officials say they are "most pleased with the results that have been thus far obtained." They've found that, at least in their operation, the Platecoils are self cleaning . . . which saves many hours of maintenance time. They've found, too, that Platecoils have a much higher rate of heat conductivity . . . which means faster tank heating.

Platecoils have a greater BTU transfer because they have more prime surface in a given area. A 22"x47" Platecoil gives the same heat transfer surface as 32 ft. of 1½" pipe. Thus Platecoil saves about 50% over equivalent pipe coil. Think what this means to you in lower initial cost, lower installation and handling costs.

Learn too, how Platecoils can be replaced without dumping the tank solution . . . how they can be thoroughly cleaned in a matter of minutes. Write today for bulletin No. P60.



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PLATECOIL

KOLD-HOLD MFG. CO.

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Free NEW CATALOGS

Begins on page 282

Hoists and Trolleys

69 Three bulletins describe hand hoists in capacities up to 4 tons, electric hoists in capacities up to 1000 lb., and trolleys in capacities up to 3 tons. Each is illustrated with photos and dimensioned drawings, complete specifications. and engineering data. Wright Hoist Division, American Chain & Cable Co., Inc.

Sheet Lifters

70 The operation and design features of lifters in many models and capacities is discussed in this 16-page booklet. Photos show the lifters in use for handling sheets 60 inches wide, tinplate, coiled stock, many other materials. Special carrying feet and angles which adapt the lifters to many specific handling jobs pictured. Cullen-Friestedt Co.

Hand Hoists

71 A 38-page booklet and several bulletins on hand hoists are offered. Compares the three types of chain hoists—differential, screw geared, and spur geared. Easy-to-read charts tell you the pull necessary to lift capacity loads, hoisting speeds, lengths and weight of chain used in the various models. Complete construction drawings, operating instructions. Most of the hoists shown in photos or drawings. The Yale & Towne Mfg. Co.

Overhead Hoists

72 Feature of this folder is many application photos showing line of single- and twin-hook monorail hoists, grab-bucket monorail hoists, cupola charging hoists, single-beam hoists, and hot metal carriers. Cab or floor operated, capacities 500 lb. to 20 tons. Shepard Niles Crane & Hoist Corp.

Hand Chain Hoist

73 Feature of this folder is 'exploded' photo view of the components of this hand chain hoist. Full specifications, drawing shows all dimensions. Also pictured are heavy chain hoists in capacities up to 80 tons, lever pullers, I-beam trolleys. Second folder describes features and operation of electric hoist. Six gear combinations and three models provide eighteen capacities. Top hook, vertical stud, or trolley suspension. The Harrington Co. *More on next page*

MORSE DRIVE SHAFTS (in five series and three types)

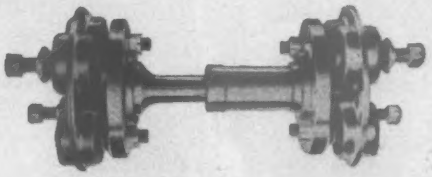
TRANSMIT POWER ECONOMICALLY RELIABLY WITHOUT LUBRICATION

Flexible Morse Drive Shafts provide a cushioned drive between separated units. They provide torsional flexibility, absorb shock, and isolate vibration while transmitting power noiselessly, dependably, safely, and economically. Four of the five series accommodate end float *and* provide full universal action.

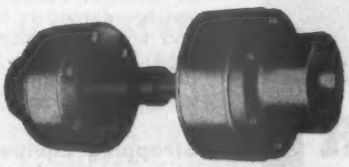
Look over the condensed descriptions of Morse Drive Shafts on this page. In addition to the standard sizes shown, special drive shafts can be made for unusual applications. Write us for more complete information.

MORSE CHAIN COMPANY
Dept. 151, 7601 Central Ave., Detroit 8, Michigan

Series T—Solid or tubular depending on capacity. Ten assemblies ranging from 13 to 725 lbs.-ft. torque capacity. Inter-flange distance from 3⅛" to 84". Misalignment compensation proportional to length of tube. HP capacity from .25 to 13.80 per 100 RPM.



Series S—Grease-tight slip joint permits end float. Provides full universal action. Six assemblies ranging from 84 to 725 lbs.-ft. torque capacity. Inter-flange distance from 10-5/16" to 17⅞". Maximum 5° angular misalignment compensation. HP capacity from 1.60 to 13.80 per 100 RPM.



Series RS (Radial Coupling Drive Shaft)—Provides end float plus added capacity. Five assemblies ranging from 158 to 2127 lbs.-ft. torque capacity. Inter-flange distance from 10⅝" to 14⅝". HP capacity from 3 to 40½ per 100 RPM.

Series ST—Basically a Series S Drive Shaft, with tubular shaft welded between hub and yoke members to provide additional length. Six assemblies ranging from 84 to 725 lbs.-ft. torque capacity. Inter-flange distance from 11-3/16" to 84". Misalignment compensation proportional to length of tube. HP capacity from 1.60 to 13.80 per 100 RPM.

Series RT—Basically an RS Drive Shaft with tubular shaft welded to each end member to provide additional length. Five assemblies ranging from 158 to 2127 lbs.-ft. torque capacity. Inter-flange distance from 11⅛" to 84". HP capacity from 3 to 40½ per 100 RPM.

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Free NEW CATALOGS

Begins on page 282

PACKING AND SHIPPING EQUIPMENT

Tape-Strap

74 Booklet describes the properties and uses of "Tape-Strap," a kraft paper-fiber tape for sealing cartons, holding cable on a reel, palletizing items such as tires and coils of hose; bundling small pipe and tubing. Strength test data, advantages listed. Drawings show some of its applications. Included is a partial list of available tape dispensing equipment. Mid-States Gummed Paper Co.

Wirebound Boxes and Crates

75 Gives construction principles of wire-bound boxes and crates, the four basic styles from which to choose, laboratory testing results, advantages. Photos show how they can be adapted to take any weight and any shape product. Lists the advantages of wire-bound construction. Wirebound Box Manufacturers Association.

Strapping Equipment

76 Series of six bulletins describes a variety of strapping tools. Included are stretchers, sealers, and cutters for handling any size and weight of strapping. Each well illustrated. Full specifications; pictures typical binding jobs. A. J. Gerrard & Co.

Round Steel Strapping

77 Describes the properties and advantages of round steel strapping and tools for applying it. Handy chart tells you the correct gage strapping to use for various weights and dimensions of boxes. On the page with each tool description, there's a list of the containers for which it is particularly suited. Gerrard Steel Strapping Co.

Steel Strapping

78 This 32-page booklet includes 15 pages showing examples of money- and material-saving applications of steel strapping. Various types of strapping and strap seals, strapping tools, stretchers, and sealers are pictured and described. Accessories for holding strap and tools also shown. Acme Steel Co., Strapping Div.

More on next page

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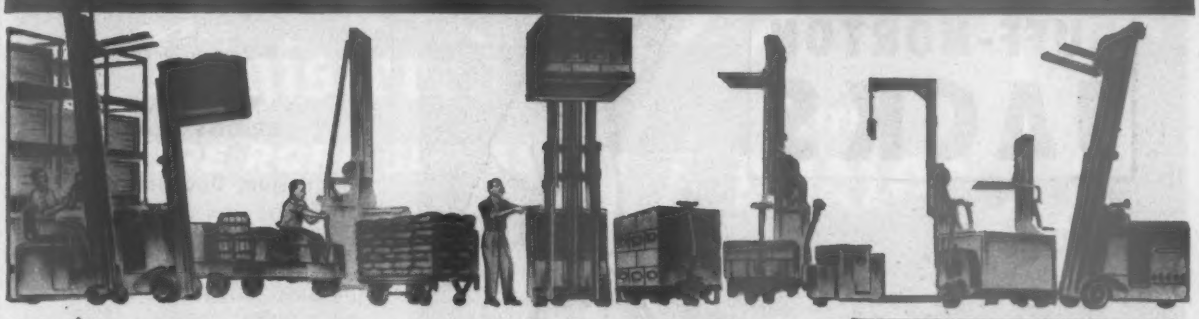

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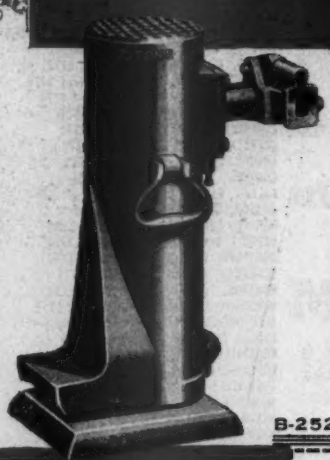

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Free NEW CATALOGS

Begins on page 282

RAMPS AND BRIDGE PLATES

Magnesium Dockboards

79 Folder describes the advantages and construction details of magnesium dockboards and two-section ramp-dockboards (for applications where truck or car is much higher than the dock). Illustrated, each construction feature pointed out. Magnesium Co. of America.

Self-Leveling Ramp

80 Ramps which can be raised or lowered to form a smooth incline between truck bed and dock. Four control systems—direct air pressure, air-oil, electric oil pump, and multiple installation — are available. Construction drawings show all dimensions, limits of adjustability. Full specifications, typical installations pictured. Globe Hoist Co.

Adjustable Loading Docks

81 Adjustable loading ramps, with electric-hydraulic power are described in this folder. Diagrams illustrate the operation of the dock, its construction and installation: show how costs are reduced by permitting palletization and truck handling. Illustrated, full specifications. Rowe Methods, Inc.

Ramps

82 Series of bulletins describe ramps in 1- and 2-ton capacity for use with hand trucks, and heavier ramps for use with power trucks. Handy chart tells how to select correct ramp for open loading platform, warehouse door, or car-to-car use. Diagrams show safety devices, how fork truck can drop ramp into place. Each is illustrated, gives full specifications. Elizabeth Iron Works.

Truck and Ramp Lifts

83 Folder illustrates the features and operation of truck lifts (which raise or lower rear of truck to dock height) and ramp lifts. Complete specifications for both units; diagrams illustrate all dimensions, angles to which units can be elevated or depressed. The Wayne Pump Co.

More on next page

ACCO Registered WIRE ROPE SLINGS

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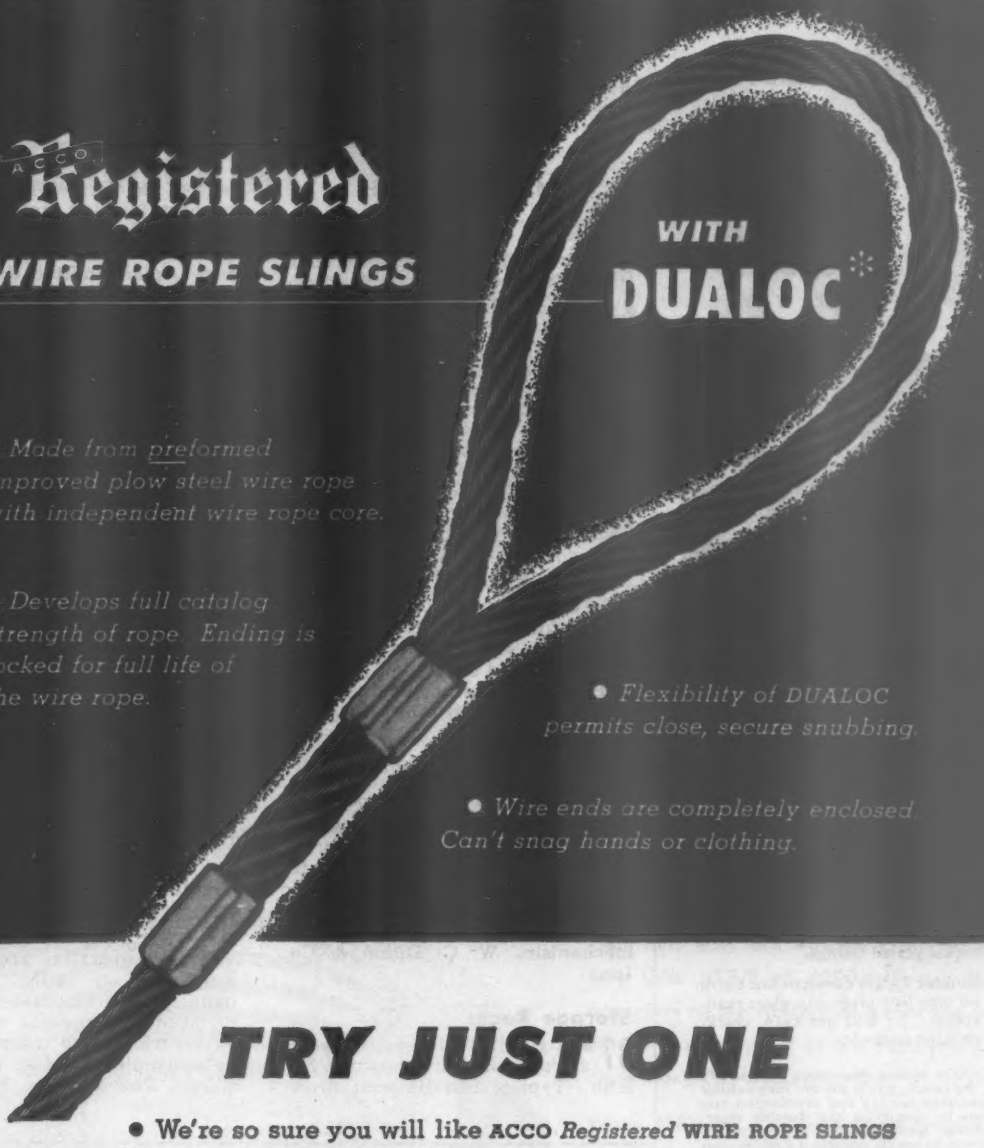

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If you're buying steel tapes with an eye to the future, you'll get the long-lasting measuring service and satisfaction you want by specifying the durable wear-defying *"Lufkin Leader."* A beauty with brawn, its tough, attractive *Vinylite* covered case protects against rough and steady usage . . . its rust-resistant stainless steel edge band and nickel plated recessed winding device assure years of corrosion-free operation.

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IMPORTANT NEW Free CATALOG

Begins on page 282

MISCELLANEOUS

Scales

84 Several bulletins are offered on scales for general or special purpose. First describes a scale for weighing high- and low-viscosity liquids which is explosion-proof, has no-drip filling valves. Second, a scale of the baggage-weighing type. Third describes a scale equipped with photo-electric cells, providing completely automatic weighing of any material. Complete specifications and working drawings. The Yale & Towne Mfg. Co., Philadelphia Div.

Storage Racks

85 Feature of this folder is many photos showing typical installations of storage racks for bar stock, pipe and tubing, etc. "Before-and-after" sequences show the space-saving possibilities. Abell-Howe Co.

Weight Indicator

86 Folder describes a weight indicator designed for use with a crane. Mounted between crane hook and load, the scale eliminates unnecessary moving of material to stationary scales. Capacities up to 5000 lb. Complete description of mechanism. W. C. Dillon & Co., Inc.

Storage Racks

87 Fully adjustable, easily erected storage racks are shown in bulletin. Typical installations; drawings of the formed steel sections—support framing, roller pipe supports, pipe clamps, concrete inserts. Complete specifications, available sizes. American Steel & Iron works.

Two-Way Mobile Radio

88 Several booklets and bulletins show the advantages of two-way radio communication for your yard vehicles, car fleet, etc. First booklet describes the "Uni-Channel" two-way radio, for dash or trunk mounting. Complete electrical and mechanical specifications and description. Second booklet is typical case history showing use of radio systems for communication with yard vehicles. Motorola Inc., Communications Electronics Div.

Rack Storage

89 Rack for pallets, platforms, drums, cases, etc., are illustrated and described in folder. Typical installations, and drawings of various types of racks shown. Instructions for most efficient "feeding" of racks by fork truck. Lewis-Shepard Products Inc.

Trailer Safety Couplers

90 Couplers for connecting trailers (hand trucks) to tractor, or trailer to trailer, are illustrated. Emphasis on safety factors—no danger of accidental uncoupling, no need for operator to stand between trailer and tractor to couple or uncouple. All-steel trailers also shown. The Mercury Mfg. Co.

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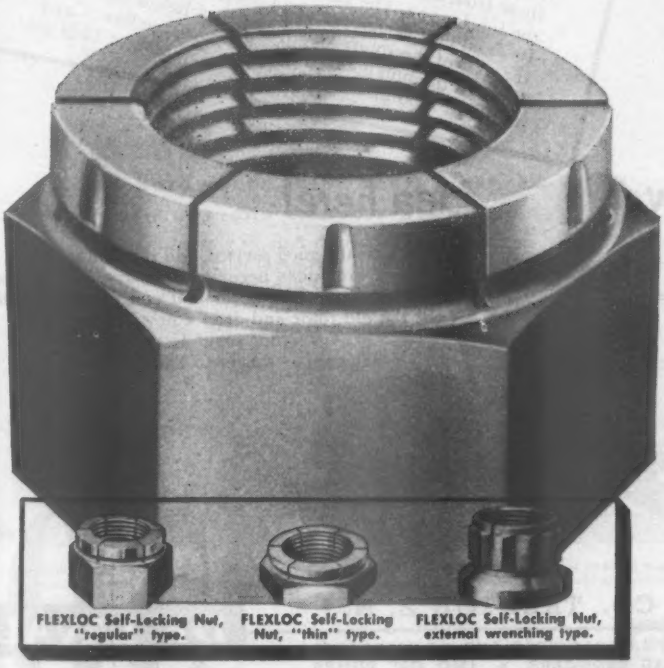


FLEXLOC Self-Locking Nut, "regular" type. FLEXLOC Self-Locking Nut, "thin" type. FLEXLOC Self-Locking Nut, external wrenching type.

Plain nuts with lock washers loosened after only ONE HOUR of 4000-cycle-per-minute operation on the vibrator of a concrete block machine at the plant of the Bethayres Concrete Block Co., Bethayres, Pa.

When FLEXLOC Self-Locking Nuts were installed, they were *still tight* when the machine was torn down for rebuilding after 6 weeks operation—at 4000 C.P.M., 17 hours a day, 7 days a week!

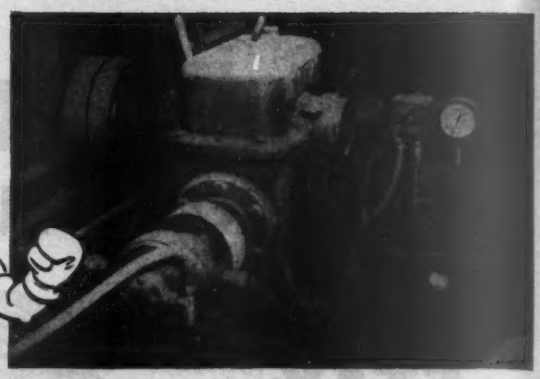
So if you have an application where plain nuts might or actually do loosen and back off, try ***FLEXLOC, the one-piece, all-metal STOP-and LOCK-NUT "that won't work loose."***

Send for Bulletin 619-A today.

SPS STANDARD PRESSED STEEL CO.

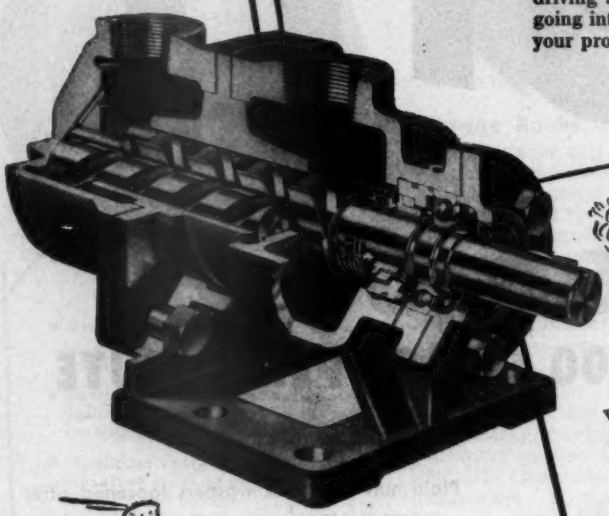
JENKINTOWN 11, PENNSYLVANIA

De Laval products at work!



Tough service?... You bet!

0 to 800 rpm in 8/10 Second . . . 26 Times per Minute. And this De Laval speed reducer takes it and likes it. This particular unit is driving a conveyor belt that automatically feeds and measures billets going into a shear. If you are rough on reducers in your plant, tell your problems to one of our power transmission engineers.



What do you want to pump?

Molasses, Glue, Lard, Soya Oil, Film Dope, Corn Syrup, Vegetable Oil, Paste, Fuel Oil, Shortening, Resin, Varnish, Linseed Oil, Viscose Rayon, Liquid Latex . . .

We frankly don't know all the other products that an IMO can pump, but if you want a better way to transfer fluids like these from one place to another, chances are an IMO can do the job for you. The IMO is a screw-type rotary pump. Its axial flow design permits liquids to be pumped close to the axis of the rotor. This means low liquid velocity through the pump and quiet pulsation-free flow. Capacities range to 1000 gpm at 500 psi and 150 gpm at 1500 psi.

There's a new idea here!

We've simplified the already simple centrifugal pump! Our new GS pump is designed so that every working part . . . every part subject to wear, is contained in one easily replaced unit rotor assembly. Through our Service and Exchange Plan new rotor assemblies are available for immediate shipment from conveniently located stocks throughout the country.

This means good service, and if maintenance ever does become necessary, all you have to do is remove the cover and end plate bolts, lift out the old rotor and drop a new one in place. *It's that easy!* Capacities to 400 gpm — heads to 230 feet.

DE LAVAL STEAM TURBINE CO., TRENTON 2, N. J.

TURBINES • HELICAL GEARS • CENTRIFUGAL BLOWERS AND COMPRESSORS
CENTRIFUGAL PUMPS • WORM GEAR SPEED REDUCERS • IMO OIL PUMPS

50th DE LAVAL Anniversary

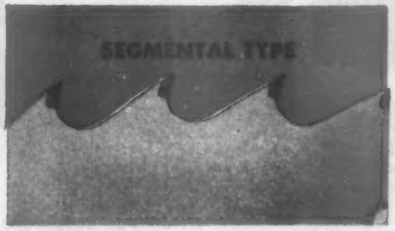
These Carbide Tips give you Hundreds of Times the Cutting Life of Regular Saws

SIMONDS SAW AND STEEL CO. FITCHBURG, MASS. U.S.A.

. . . on hardwoods, plywoods, plastics, compositions and non-ferrous metals

Cutting edges that stay sharp for weeks, sometimes months . . . smooth, straight cuts that need little or no finishing . . . record-breaking uninterrupted work-runs . . . dependable, trouble-free, proven performance with savings all along the line . . . all this and more is now yours with SIMONDS CARBIDE-TIPPED SAWS. Made to Simonds rigid, high-quality standards in tooth-spacings and types for specific applications as described below. Ask your dealer today for new, illustrated fact-sheet . . . see how you can step up production and cut your costs with these specially designed SIMONDS SAWS.

SOLID TYPE—Fine Tooth Used on double-end tenoners, and for ripping or trimming plywoods, laminates, abrasive materials such as bakelite, and for regular cut-off work. *(Large saw at top of page* is the coarse-tooth Solid Type for general work in furniture and millwork plants.*)*

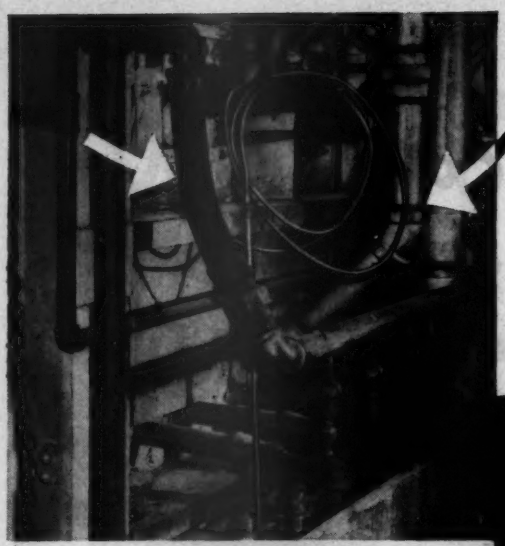


SEGMENTAL TYPE For cutting aluminum, magnesium, bronze, and other non-ferrous metals . . . coarse or fine teeth replaceable in segments.

INSERTED-TOOTH TYPE For non-ferrous metal cutting applications similar to Segmental Type. Any tooth can be quickly and easily replaced.

Branch Offices in Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.

SIMONDS SAW AND STEEL CO. FITCHBURG, MASS.



Carries Fire and Water

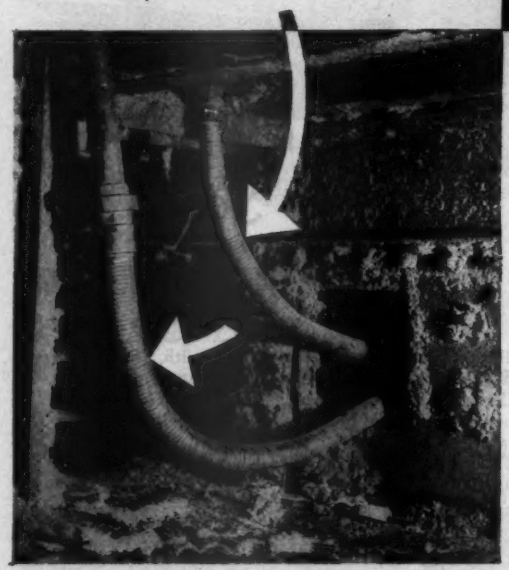
This coil of American Flexible Metal Hose feeds gas to torch for lighting annealing furnace burners. It replaced nonmetallic hose which rapidly deteriorated. Large section of hose in foreground carries coolant water to furnace heater, compensates for pipe line misalignment and expansion.

Permits Bigger Bite

Originally, swing joints connected 600 p.s.i. hydraulic lines to platens for holding metallic billets during shearing on this machine. But swing joints limited travel for billet size adjustments. Now American Flexible Seamless Bronze Tubing lets machine take maximum bite.

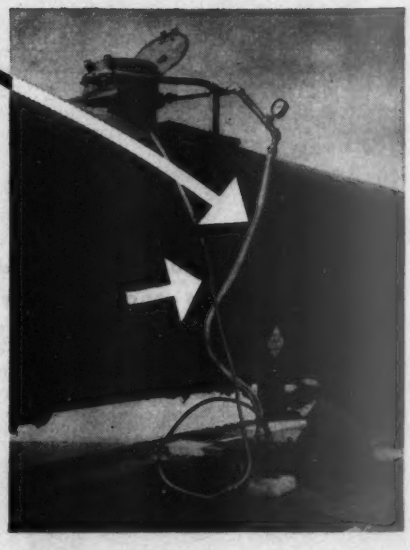
Ignores Molten Metal

Only metal hose like this American Flexible Interlocked Bronze Hose can ignore regular splashings by molten casting metal. These carry supply and return water at 150 p.s.i. for cooling casting molds.



Makes Unloading Easy

American Seamless Flexible Metal Tubing makes unloading this car of liquid propane easy. Propane vapor at 125 lb. pressure is pumped into tank car through combination ¾ in. and 1 in. flexible metal tubing, forcing out propane liquid through 2 in. flexible tubing connection between dome and storage tank lines. American Seamless stands wear, makes car-spotting simple.



let it help you. American Flexible Metal Hose or Tubing can simplify your product or operations wherever flexible connectors are needed: for piping or ports that move, vibrate or are out of alignment; for carrying almost any liquid, gas or semi-solid. American Flexible Metal Hose and Tubing are tight, strong and corrosion-resistant.

Bulletins SS-50 and CC-300 contain information you ought to have about these versatile products. For your copies, just write The American Brass Company, American Metal Hose Branch, Waterbury 20, Connecticut. In Canada: The Canadian Fairbanks-Morse Company, Ltd.

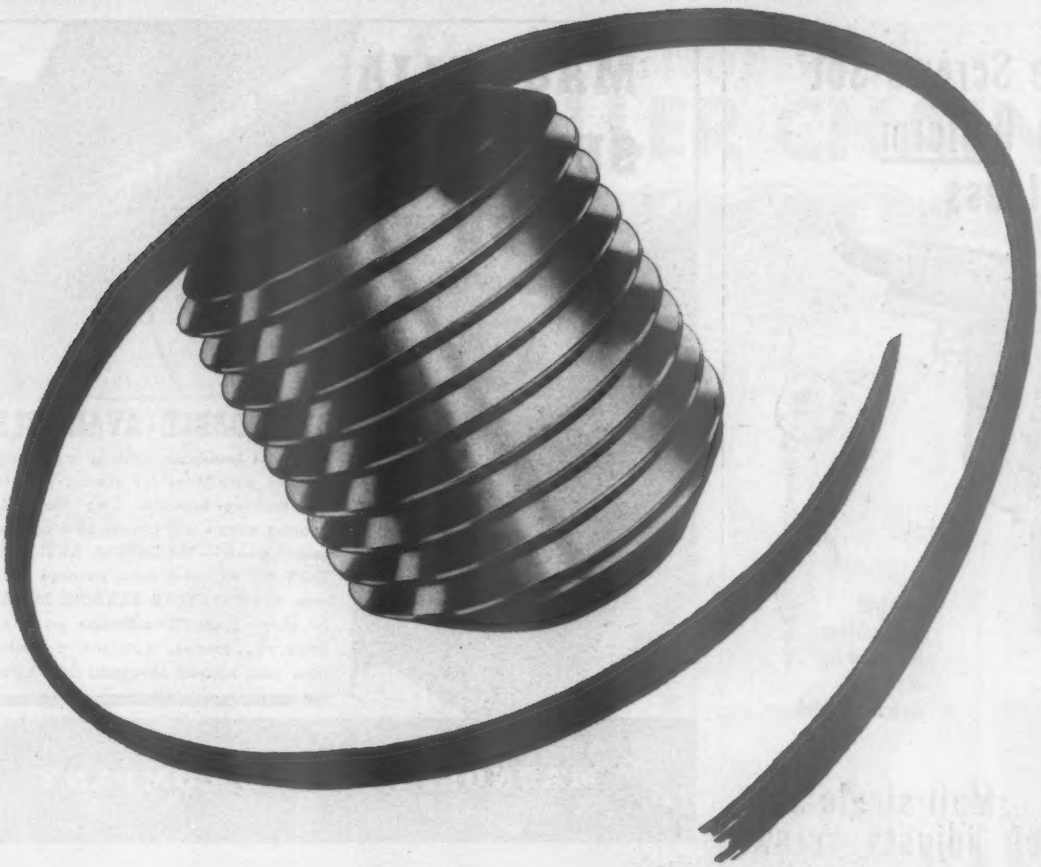
51234

wherever connectors must move . . .

American

ANACONDA

FLEXIBLE METAL HOSE AND TUBING



WANTED

for more of industry's finest products than ever before

Most products assembled with Socket Screws are engineered to meet demands for efficiency and endurance well above common standards.

To make sure of fastenings equal in quality to other components, more manufacturers are specifying Parker-Kalon Socket Screws than ever before. The reasons are clear.

Just look at a P-K* Ground Thread Socket Set Screw, for example. You can see and feel the difference. By any standard of comparison, no finer screws are made. And the P-K Quality-Control makes sure that every screw in every box meets specifications.

P-K production is going all-out to meet this mounting demand. For D.O. or other assemblies, set your standards by P-K quality. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y.

P-K
TRADE MARK
REG. U.S. PAT. OFF.

FOR ANY TYPE OF SOCKET SCREW
REMEMBER — IF IT'S P-K . . . IT'S O.K.*

Flat Head Socket Cap Screws • Size-marked Socket Head Cap Screws
Stripper Bolts • Ground Thread Socket Set Screws • Pipe Plugs • Hex Keys
Available Through Accredited Distributors.

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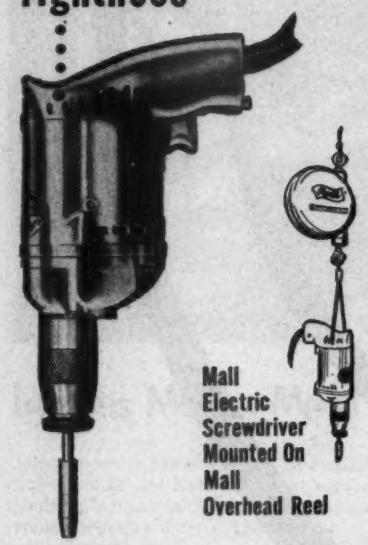
cold-forged
SOCKET SCREWS

More Screws Set With Uniform Tightness



Mall single slip clutch adjusts screw tension automatically

We'll prove it in your plant. Here's a screwdriver that controls selected screw tension for you. Clutch automatically "slips" to assure the same tightness for every screw. Eliminates stripping screw threads or breaking studs. Adjust clutch tension without dismantling. Constructed of lightweight aluminum alloy. Easy to handle in hard-to-get-at places. Two finder-type bits furnished.

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☐ I would like a free demonstration in my own plant.
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Mall POWER TOOLS
Put POWER Into MANPOWER
Manufacturers of over 1000 Tools for a Million Jobs

MAGNOLIA SUBSTITUTE FOR TIN-BASE BABBITT

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Magnolia lead-base babbitts are ready, reliable substitutes for scarce, hard-to-get tin-base babbitts. Two Magnolia bearing metals will handle 99% of your requirements — MAGNOLIA ANTI-FRICTION METAL for general purpose bearings and DEFENDER BEARING METAL for shock loads. Standardize today on these two grades. Both are available from your nearest Magnolia Distributor.

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MAGNOLIA METAL COMPANY

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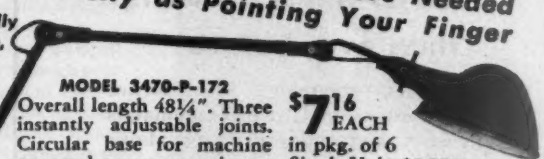
FOR BETTER LIGHT ON THE JOB

Directs Light Exactly Where Needed as Easily as Pointing Your Finger

Designed Especially for Machine Tools, and Work on Assembly and Inspection Benches



MODEL 3470-P-172
Overall length 48¼". Three instantly adjustable joints. Circular base for machine or wood screw mounting.

$7.16 EACH in pkg. of 6
Single Units $8.95 ea.

- **Rugged Construction** to stand strains and shocks.
- **Instantly Adjustable** with full swivel ball and socket joints.
- **Infra-red Baked Enamel Finish** — Exterior, Wrinkled Gray — Reflector Interior, high temperature White.
- **Reflector** accommodates 100 watt A-21 medium screw base lamp.
- **Wired Complete** with switch socket and 8 ft. oil resistant cord.

WRITE FOR COMPLETE CATALOG of Localite models with various type reflectors, arms and bases for every industrial use.

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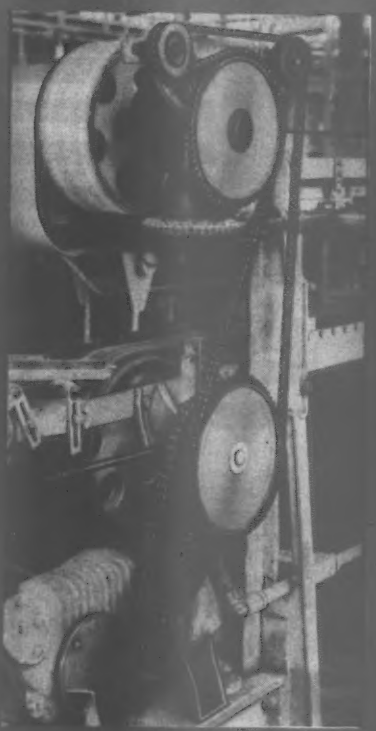
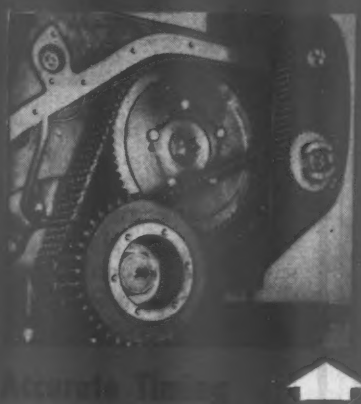
Localites are available through selected distributors everywhere.

You Can Do It Better With
DIAMOND ROLLER CHAINS





● The Diamond engineering staff is well experienced in recommending drive selections to meet all requirements. Special precision manufacturing facilities and skill insure uniformity of quality and great reserve strength required for long-life performance. *Practical recommendations are yours for the asking.*

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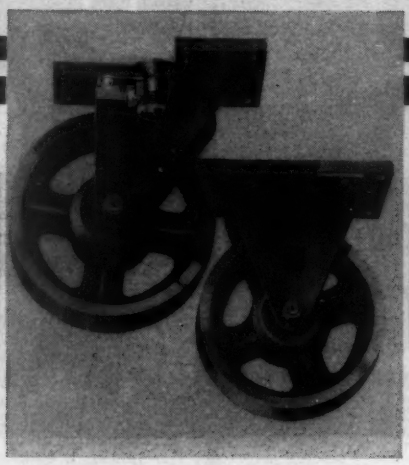
DARNELL CASTERS

Always SWIVEL and ROLL



Let the skill of Darnell engineers furnish the sources of profit in caster use. There are valid reasons for Darnell leadership. In every Darnell Caster and Wheel there is a responsibility that is reflected in maximum

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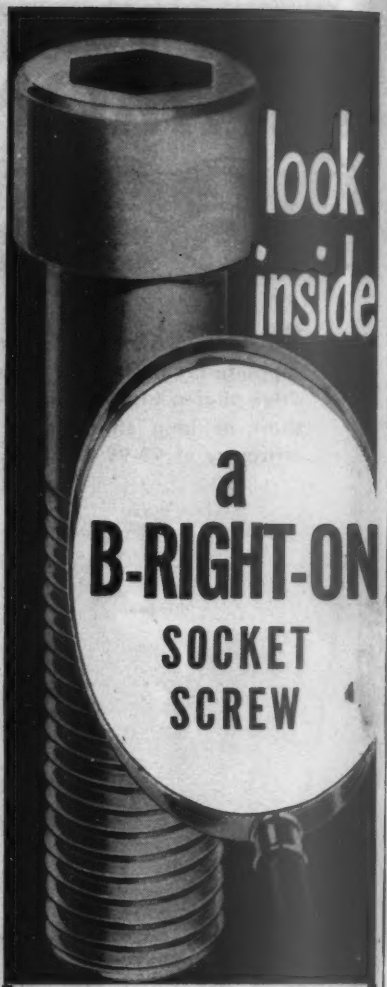

There's more than meets the eye in a Brighton Socket Screw! Brighton Nu-Process, an entirely new metal working process, forms special alloy-steel into screws with continuous unbroken fibers and fine, compact grain. This greater toughness allows greater strength and hardness.

New catalog now ready. Write for your copy.

The BRIGHTON SCREW & MANUFACTURING CO.
Reading Road opposite Deer Creek
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BRIGHTON
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THE NEW

Polyken®

INDUSTRIAL TAPES

TAILORED TO YOUR JOB

EIGHTEEN TIMES THE FORCE OF GRAVITY is secured with *Polyken* Tape No. 276. Picture taken at the Aerojet Engineering Corp.

We're over Peoria, *weren't* we?

Shades of Kitty Hawk!

When a man can get up in the air and, with jet power, go over 650 m.p.h., it's time we oldsters hit for the tall weeds. That's more than 10 miles a minute—or about the distance Pop covered in an hour when he took the eggs to town.

Another use of jet power is in shortening the take-off distances of propeller-driven planes. When the Aerojet Engineering Corp. introduced JATO (Jet-Assisted Take-off), distances were cut 50%. But possible trouble existed, because when the jet was ignited, the terrific initial thrust tended to rip the charge loose from its shell.

The Polyken Sales Engineer suggested *Polyken* Industrial Tape No. 276 to lick this problem. *Polyken* No. 276, a Fiberglas*-backed pressure-sensitive tape strong enough to resist a pull of 14,500 pound-seconds (or 18 times the force of gravity), is used to bind the plug and cap assembly that secures the charge to the shell. The tape is strong enough to keep the charge from moving when the powerful energy thrust occurs.

We tell you the JATO story as an example of how tape that's "tailored to your job" can do things you never dreamed tape could do. Let us study *your* problem, and we'll come up with a tape that will save you money, time and effort. That's a challenge. Won't you take us up on it?

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FREE SAMPLES. Write today for complete engineering data, plus samples of *Polyken* No. 276. Address *Polyken*, Dept. FME, 222 West Adams Street, Chicago 6, Illinois.

Polyken Industrial Tape, Department of Bauer & Black, Division of The Kendall Company

Push-button "cold wave"

ANOTHER EXAMPLE OF PRODUCT IMPROVEMENT THROUGH AIR CONDITIONING AND REFRIGERATION

TODAY . . . when manufacturers wonder how their products behave at extreme altitudes, they simply push a button to create a sub-zero cold wave of stratospheric temperature.

The "climate room" shown above is installed in the experimental laboratories of a leading producer of electronic devices. Delicate instruments are exposed to low temperature conditions encountered in actual use . . . enabling engineers and physicists to perfect precision-built equipment. Controlled temperature chambers, such as this, add constantly to scientific development.

Throughout industry there are many practical applications of refrigeration and air conditioning. Cutting oils are mechanically cooled . . . steel is cold-treated . . . "miracle drugs" receive a "dry-freeze" . . . plastic abrasives are molded in controlled temperature and humidity. These, of course, are but a few of the ways in which refrigeration and air conditioning contribute to product betterment . . . lower production costs . . . simplify operations . . . improve working conditions.

Why not determine how air conditioning or refrigeration might readily enable you to improve your own plant procedures? Your engineer, consultant, architect or contractor will gladly offer suggestions . . . and recommend equipment utilizing "Freon" safe refrigerants for maximum protection, economy and efficiency in all types of industrial applications. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

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Better Things for Better Living . . . through Chemistry

KINETIC
FREON
SAFE REFRIGERANTS
"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

IT WILL PAY YOU TO INVESTIGATE A PLANT LOCATION IN

EL PASO

Many types of light manufacturing industries can and do operate profitably in El Paso, Texas; the availability of natural gas, low cost power, competent labor, and excellent climate, make it an attractive location for others. It will be worth your while to send for El Paso's new Industrial Booklet and get the facts. We'll be glad to furnish any specific technical information you may need also.

GET THIS BOOK

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A COMPLETELY INSULATED
SPLICE
IN 3 SIMPLE STEPS

A PERFECT WIRE
TERMINATION
IN 1 EASY OPERATION

ALL
installed with
1
"pres-SURE-tool"

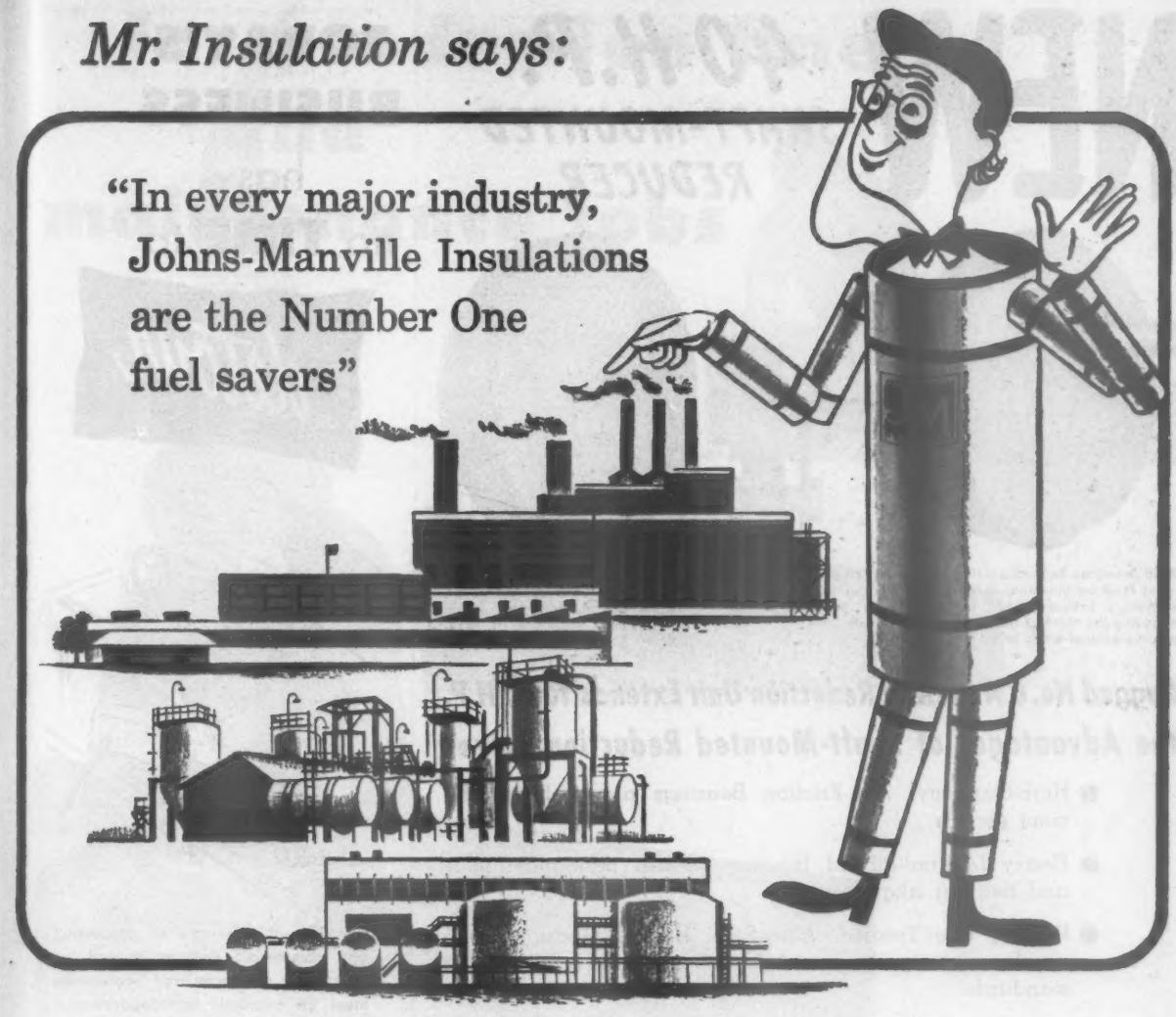
ONLY 2 Splice Caps for 2 # 16 to 3 # 8 wires

ONLY 1 'Termond' for 1 # 16 to 1 # 8 wire

BUCHANAN
Electrical Products Corporation

WRITE FOR CATALOG F105

Mr. Insulation says:



IN PLANTS with stacks or stills, tanks or towers, the story is the same—"Insulation by Johns-Manville" means the maximum return on your investment. There are two good reasons for this:

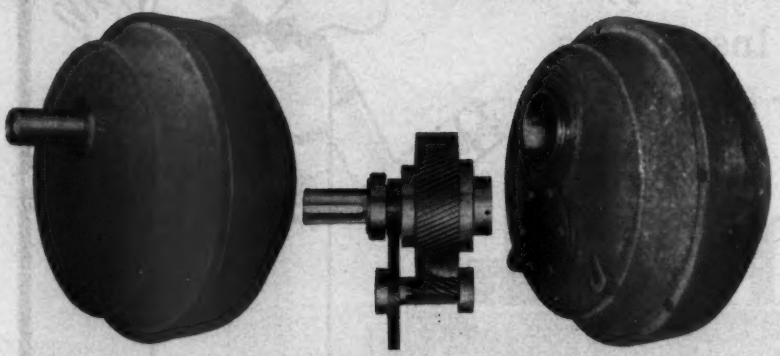
1. YOU GET THE RIGHT *MATERIALS*—From asbestos and other selected raw materials, Johns-Manville manufactures a wide range of industrial insulations for service from 400F below zero to 3000F above. If you need engineering advice in determining exactly the right one for your job, you can get experienced and authoritative assistance from your local Johns-Manville insulation engineer.

2. YOU GET THE RIGHT *APPLICATION*—Even correctly selected insulation needs proper application to permit it to serve at peak efficiency through the years. Here you can always count on J-M Insulation Contractors and their highly skilled mechanics. These organizations are trained in Johns-Manville application methods, and have generations of insulation experience behind them.

Why not get the complete picture? Call on insulation headquarters when your next job is in the planning stage. Just write Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville *first in* **INSULATIONS**

NEW 40 H.P. SHAFT-MOUNTED REDUCER



No. 6 American Reduction Unit showing input shaft for mounting of the driven sheave in primary V-belt drive. By changing the ratios of the V-belt drive, you can get any speed below 110 R.P.M.

Arrangement of gears and bearings in No. 6 American Reduction Unit.

No. 6 American Reduction Unit showing output hub for easy mounting on the shaft of the driven machine by means of a split, tapered bushing.

Rugged No. 6 American Reduction Unit Extends to 40 H.P.

the Advantages of Shaft-Mounted Reduction Drives

- High-Capacity, Anti-Friction Bearings assure long, efficient service.
- Heavy Internal-Ribbed Housing assures permanent gear and bearing alignment.
- Forged, Heat-Treated, Alloy-Steel Helical Gears provide ample capacity and quiet operation. Meet A. G. M. A. standards.
- Exclusive Oil-Seal Design and Location Above Oil Level prevents oil leakage.
- Ample Housing Size prevents overheating.

Clip and mail the coupon below for complete information on this new reduction unit and the entire line of American Reduction Drives.

Standard units for drives from one to 40 H.P. are available from stock.

AMERICAN
The Original Shaft-Mounted
REDUCTION DRIVES

MAIL TODAY!

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Please send me complete information on the exclusive American torque-arm Overload Release for use with American Reduction Drives.

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TODAY'S BUSINESS has no TIME to

Speed is the essence of production and commerce! Detours caused by manpower shortages and bottlenecks must be avoided! Interdepartmental Communications—orders, exchange of ideas, confidential instructions — all must be fast, direct, without needless, time-wasting detours.

Kellogg SELECT-O-PHONE answers every requirement. Automatic, needing no operator and independent of your outside switchboard, SELECT-O-PHONE handles *inside* telephone traffic, greatly augments your city phone, knits your organization into a closer, smoother-running, more efficient unit.

Write Today for Complete Information

Get the facts! You owe it to yourself and your business to find out all about SELECT-O-PHONE. Write Dept. 12-E, SELECT-O-PHONE Division, Kellogg Switchboard and Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.

Select-O-Phone
THE *INSIDE* VOICE OF BUSINESS
KELLOGG

for production line and maintenance jobs

There is a CP Air Impact Wrench for any job from ¼" to 1¾" bolt size.

CP Reversible Air Impact Wrenches—light, compact, well-balanced—speed assembly line work. CP impact action—having no twisting force or kick—minimizes operator fatigue and promotes peak production.

For service and repair jobs these wrenches cut nut-running time to one-fifth of that required with ordinary methods.

Models are built in capacities from ¼" to 1¾" bolt size; they are the only impact wrenches available with 45° and 90° angle heads.

Write for Bulletin 812-8

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Gummed Tape
THE ONLY CLOSURE THAT DRESSES UP YOUR CARTONS

Your cartons look neater and more efficient with gummed tape. Every seam and corner is smoothly finished off with a closure of tape — "tailor made" to the job. Your shipment gains an appearance of quality that no other closure can give.

You can choose from golden brown kraft or a variety of attractive contrasting colors. You may have your tape printed, too, with your company name, trademark, or message. Each carton becomes an advertisement for you.

Your cartons have more customer-appeal when protected with gummed tape. They arrive at the customer's door in better condition . . . with their contents intact, too, sealed against dust, moisture, and insects.

Gummed tape . . . first choice among closures

ORANGE CORE
Copyr. H. P. & P. Corp
GUMMED SEALING TAPE

and for smoother, faster sealing

Orange Core is now Supple-ized

Supple-izing is an exclusive Hudson process to make Orange Core tape more flexible. The adhesive and kraft are treated to take out the stiffness and prevent curling. Supple-izing makes Orange Core pliant and supple . . . easier and faster to handle. It helps make a neater closure, with more smoothly folded corners. Try Orange Core in your own shipping room.

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Multiplies Manpower

The pinch of the manpower shortage is more reason than ever why 'Budgit' Electric Hoists belong in your plant.

You want more output. You want to hold costs down. Put 'Budgits' to work and you accomplish both. These hoists handle heavy lifting jobs easily and quickly — give your men more time for *actual* production. They save energy — eliminate that tired feeling — safeguard workers from the hazards of manual lifting.

'Budgit' Electric Hoists are complete, portable lifting units — cost nothing to install. Just hang up, plug in and they're ready to boost production, cut costs. A few cents a day buys all the electricity they use.

Save time and money in your plant — with 'Budgit' Electric Hoists. Capacities range from 250 to 4,000 lbs. Prices begin at $119. Phone your nearby Shaw-Box Distributor or write to headquarters for descriptive Bulletin No. 391.

MAXWELL MANNING MOORE TRADE MARK

'Budgit' HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial and 'Microsen' Electrical Instruments.

Filter plant, Freedom Valvoline Oil Company, Freedom, Pa. Roofing and siding are "Century" Asbestos-Cement Corrugated. Erection Contractors: Elwin G. Smith & Company.

THIS modern filter plant of the Freedom Valvoline Oil Company, Freedom, Pa. is typical of the many progressive industrial plants throughout the nation where "Century" Corrugated Asbestos-Cement Sheets have been used for both roofing and siding.

The choice of "Century" Asbestos-Corrugated is a logical one wherever quick application and maintenance-free service are desired. "Century" Asbestos Corrugated goes on quickly, inexpensively. The large-size sheets are exceptionally strong, but they can be cut and drilled easily—fastened in place with a minimum of labor.

And the protection is permanent! "Century" Asbestos Corrugated resists weather; *can not burn*, rot, or rust. Rodents and termites can't hurt it. It doesn't even need protective painting to preserve it!

Whatever your building plans—new construction, modernization, expansion—get the cost-saving story of "Century" Corrugated Asbestos-Cement Sheets. We'll gladly send complete data on request.

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

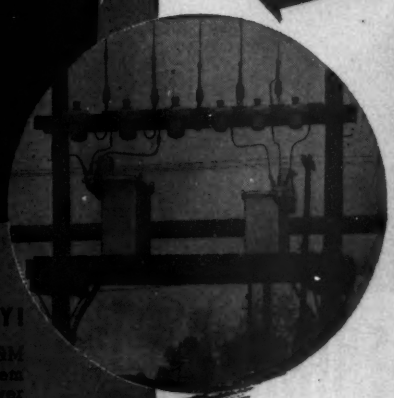
KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

EC&M Builds 2300 Volt Motor Starters IN UNIT-FORM

FOR SAFETY . . .

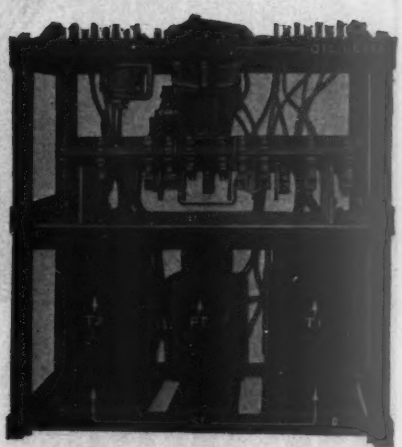
FOR CONVENIENCE IN INSTALLATION . . .

FOR LONG LIFE . . .



THEY COULDN'T RISK A DELAY!

Prominent oil refinery selected EC&M 2300 volt Starters and mounted them out-of-doors on platform between power poles.



Note clean-cut design of this reduced voltage starter mechanism for 2300 volt motors.

CLEAN-CUT DESIGN

1. Single, quick-break, double-throw contactor operated by a single magnet.
2. Two liberally-rated auto-transformers marked T_1 and T_2.
3. Potential transformer (marked PT) for 220 volt push button circuit.
4. Current limit relay trips mechanical latch to transfer from reduced to full voltage.
5. Variable reactor on top of mechanism permits quick change of transition-setting, when desired.
6. Continuous torque acceleration.
7. High torque efficiency in starting.
8. Adjustable, magnetic type overload relays, arranged for magnetic reset from push button.

● In many plants, managements have come to know that EC&M Unit Starters are a valuable ally for their 2300 volt motor starting requirements. Complete enclosure of all high voltage parts not only provides a *shock-proof* installation but reduces time and material in installation. With the mechanism totally oil-immersed, operating parts are always lubricated and also protected from corrosion. Push button operation brings the motor up to speed with greater skill than human hands could do it. What could be safer—more reliable!

Ask for Bulletin 1047-C

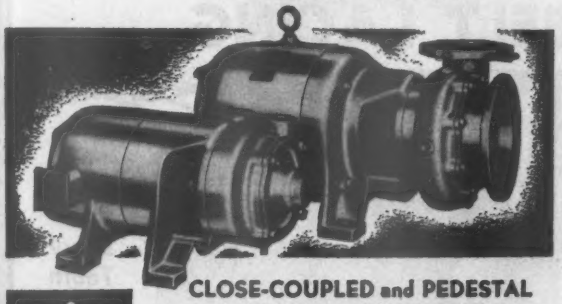
THE ELECTRIC CONTROLLER & MFG. CO.

2698 E. 79th ST. ★ CLEVELAND 4, OHIO

New... Different

THE "ALTA" LINE

FOR INDUSTRIAL USE



CLOSE-COUPLED and PEDESTAL GORMAN-RUPP PUMPS

This new line of centrifugal pumps combines all the advantages of exact hydraulic engineering with best mechanical design.

Alta Pumps are outstanding in efficiency serving a capacity-head range up to 1000 G.P.M. and 200 feet head with 14 sizes, 1 to 4 inches.

Open as well as enclosed type impeller for slurry and other services.

For detailed information ask for Bulletin 9-IP-11.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

Just because Joe enjoys a good stogie, he shouldn't assume Mary enjoys one, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little.*

Gits oil cups have been the standard for industry for more than 40 years. Gits Bros. has the largest selection of oil cups available anywhere. Call on Gits Bros. for a prompt, efficient solution to your lubrication problems.

Write for free Price Guide Catalog

GITS BROS. MFG. CO.

1831 S. Kilbourn Ave. • Chicago 23, Ill.

"Quit worrying about lost production and do something!"

SARAN LINED steel pipe

Right now is the time to act! Take steps toward preventing costly production delays in the future. Specify corrosion-resistant saran lined steel pipe! You'll find, as have many of the country's leading manufacturers, that this remarkable pipe means dependable long term operation at a minimum maintenance cost. Saran's unusual resistance to most chemicals and solvents plays an important part in the reduction of shutdowns and lost production. Another advantage is its ease of field fabrication involving NO costly delays with special tools or handling.

These advantages are important to you, so "quit worrying and do something." Mail this coupon to The Saran Lined Pipe Co.

Saran Lined Steel pipe is manufactured by The Dow Chemical Company.

Distributed by

Saran Lined Pipe Company

2415 BURDETTE AVE., FERNDALE, MICH.
Offices in New York • Boston • Pittsburgh • Tulsa • Philadelphia • Chicago Portland • Indianapolis • San Francisco Houston • Denver • Los Angeles • Seattle Cleveland • Charleston, S. C. • Toronto

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Please send me a copy of your catalog on Saran Lined Pipe, Valves and Fittings.

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Title_____

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State_____

MTSP-521

SARAN LINED PIPE
DOW
product

SAVE—with Safety use a SIMPLEX on every Jacking Job

• Save time and money on every job with this easy-to-use, Simplex Emergency Jack that is engineered for safety. Jack tilts on base for angular operation. Lifts full capacity on cap; on auxiliary cap shoe; on the machine serrated toe, or at any intermediate point by using chain as sling!

• RATCHET LOWERING JACKS

A Complete Line for Every Jacking Job

Safe! Fast! Powerful!

1½ to 35 Tons Capacity

For all general duty lifting, lowering, moving, leveling, skidding.

• SCREW JACKS

88% Easier Lifting!

4-Way or Ratchet Head Types

31 Models—10 to 24 Tons Capacity

Single ball nested under cap won't flatten; cap can't slip. Friction reduced 88%. Malleable housings.

• HYDRAULIC JACKS

Leakproof Neoprene Seals

8 Models—3 to 100 Tons Capacity

Tested to 50% Overload

For shops, factories, construction, transportation and mine jacking.

SEND TODAY FOR BULLETIN: INDUSTRIAL 49

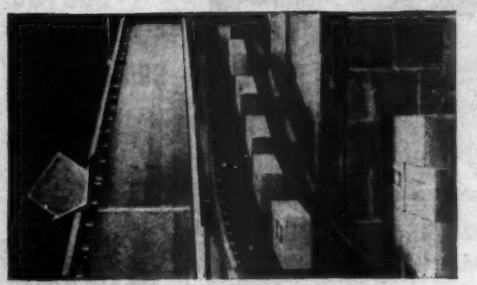
Simplex
LEVER • SCREW • HYDRAULIC
Jacks

TEMPLETON, KENLY & CO.

1018 South Central Avenue

Chicago 44, Illinois

ALLIGATOR CONVEYOR BELT LACING



In Long Continuous Lengths for Conveyor Belts . . .

★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
★ In canneries where corrosion or rust is a problem specify Alligator made of Monel.
★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
★ Separable and smooth on both sides.
★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width.*

Order from Your Supply House. Ask for Bulletin A-60

FLEXIBLE STEEL LACING CO., 4678 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

AERVOID AIDS to speeded-up industrial feeding

AerVoiD Hot Food Carriers, AerVoiD Hot Liquid Carriers, AerVoiD Mobile Canteen

Hot flavorful foods kept hot by AerVoiD high vacuum insulation for workers that cannot come to a cafeteria without too much loss of time. A hot coffee pick-up for workers at their work with AerVoiD vacuum insulated liquid carriers. Hot coffee and light refreshments serviced directly to workers at their work with the AerVoiD narrow aisle Mobile Canteen.

In peace or defense industrial feeding AerVoiDs do a job that cannot be accomplished with any other equipment . . . because AerVoiDs alone do the job of transporting and distributing of hot foods for service a distance from the kitchens where they are prepared.

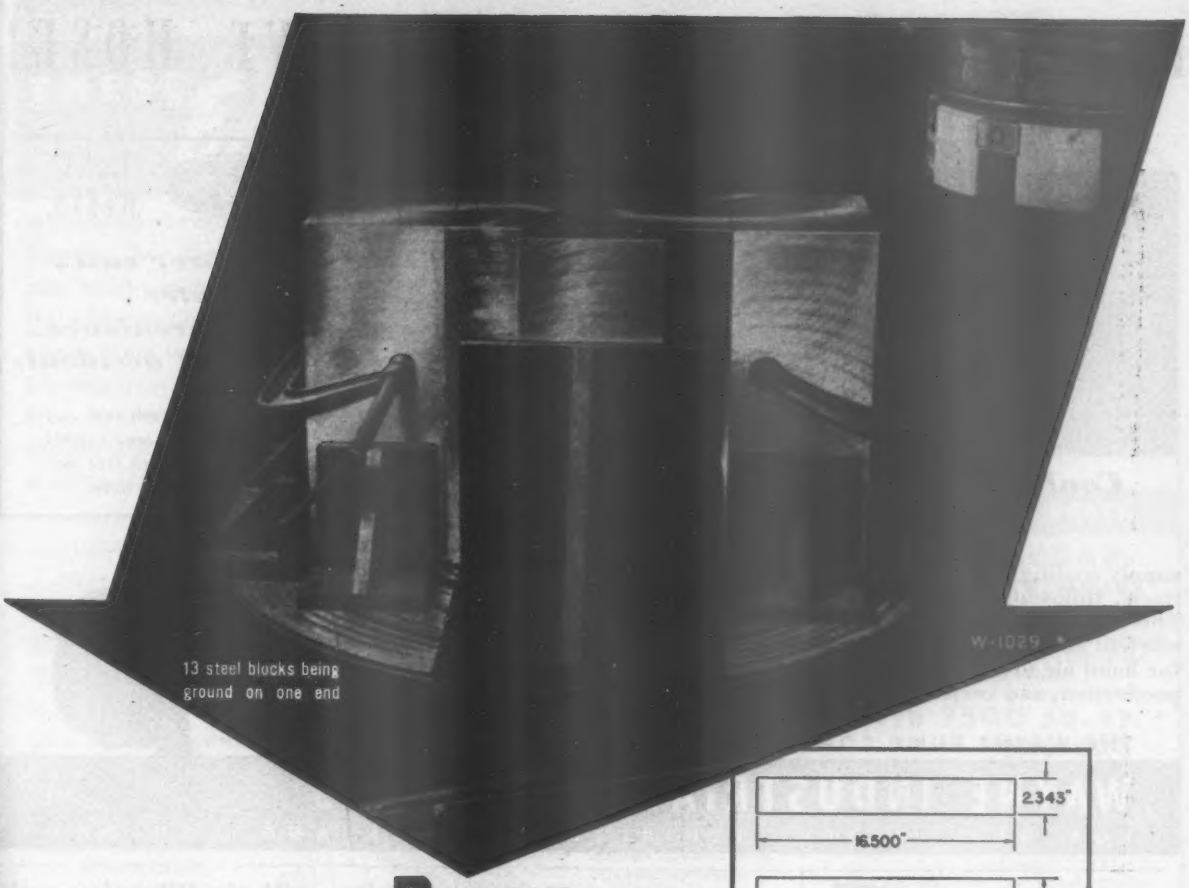
WRITE TODAY

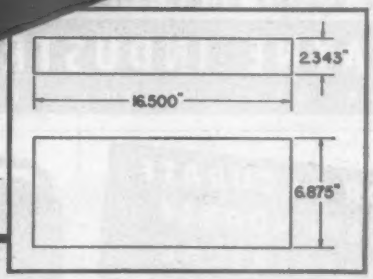
for illustrated bulletin "The Job AerVoiDs Do In Industrial Feeding" and special circular on "AerVoiDs In Defense Industrial Feeding."

VACUUM CAN COMPANY

19 South Hoyne Avenue — Chicago 12, Illinois

AERVOID *vacuum insulated*
HOT FOOD, SOUP, AND COFFEE CARRIERS





Put it on the BLANCHARD

√. . . for stock removal

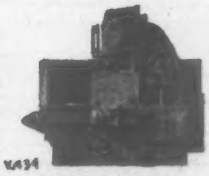
These annealed steel blocks were ground on all 6 surfaces on a Blanchard No. 18 Surface Grinder. Rough size was 16¾′ x 7⅛′ x 2½′. *37.439 lbs. of metal were removed from each piece!*

√. . . for speed

Thirty of these steel blocks were ground on all 6 surfaces in 42½ hours. *This is a floor-to-floor time of only 85 minutes each.* All surfaces were ground square within .002′, and flat and parallel.

√. . . for comparison

Let Blanchard grind some sample parts, or give you estimates from prints of your surface machining jobs. A comparison with your present methods may surprise you!



NO. 18 BLANCHARD SURFACE GRINDER

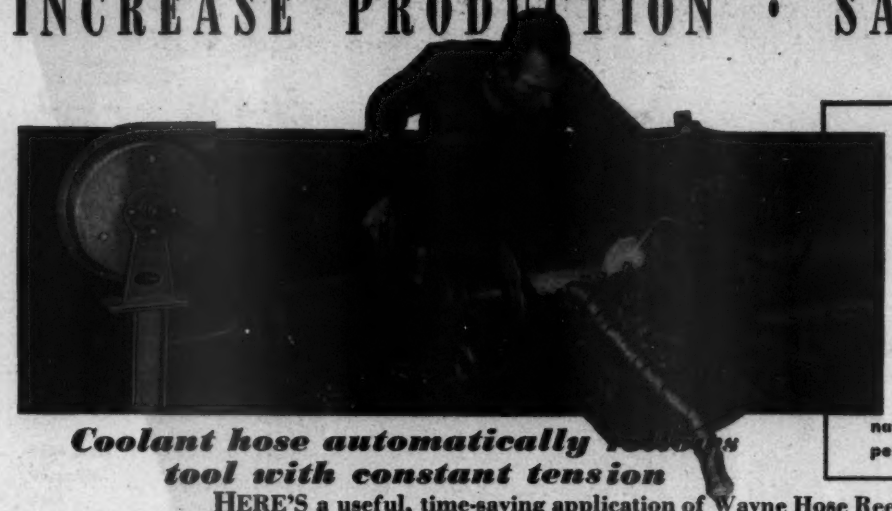
V-434

Send for your free copies of "Work Done on the Blanchard," fourth edition, and "Art of Blanchard Surface Grinding."

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

INCREASE PRODUCTION • SAVE HOSE!



Wayne **HOSE REELS**

lower cost— greater convenience— prevent accidents

Convenient bench reel . . . mounts anywhere. Combination air supply and tool suspension. Saves costly hose.

Coolant hose automatically [illegible] tool with constant tension

HERE'S a useful, time-saving application of Wayne Hose Reels to supply cooling liquids in machine operations. The hose automatically extends or retracts, following the tool. Operator does better work, with full attention to tool. There are no loose hose loops to cause accidents. Wayne Hose Reels are simple, neat efficient and save more hose in a few months time than they cost. They are also used for hand air tools, providing both suspension and air supply. Convenient, speed up production, and keep tools off bench, yet in convenient reach. Write for bulletin.

HOSE REEL DIVISION

THE WAYNE PUMP COMPANY • FORT WAYNE, INDIANA

WAYNE INDUSTRIAL HOSE REELS

Model 343

FOR AIR, WATER, FLUID LUBRICANTS AND COOLANTS

FOR ACCURATE DEPENDABLE ELECTRICAL MEASUREMENTS

Specify Simpson

You can be sure your designs will work out well in production when you depend on "Simpson accuracy and dependability." For behind every Simpson instrument—whether panel or portable, custom-built or stock—is a world-wide reputation for quality. Let Simpson engineers help you solve your instrument problems — and for your standard instrument requirements take advantage of our large stock.

Mail coupon below for your *FREE* Simpson Catalog

SIMPSON ELECTRIC COMPANY
5200 W. Kinzie, Chicago 44 • CO 1-1221
Please send me Simpson Catalog No. 16 showing complete line of Simpson Electrical Instruments and Test Equipment

Name_____

Company_____

Address_____

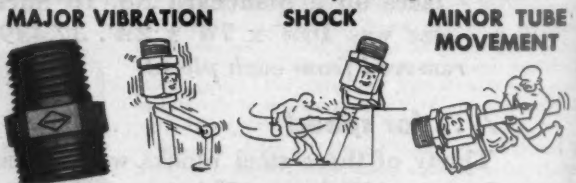
Dept. G

The Tube Coupling with the Vibration and Shock Absorbing Sleeve.

IMPERIAL FLEX FITTINGS

stand up under the most severe operating conditions of

MAJOR VIBRATION **SHOCK** **MINOR TUBE MOVEMENT**



This Synthetic Elastic Sleeve Absorbs Vibration and Shock . . . assures a positive pressure-tight seal . . . ideal for industrial equipment.

Flex Fittings Make Joints Virtually Indestructible by Vibration.

Flex Fittings Can Be Used with All Kinds of Tubing . . . very easy to install.

Proved By Extensive Use...used as standard equipment on trucks, tractors, diesel engines, oil filter connections, machinery etc. Ask for Catalog No. 344-C.

See Your Industrial Distributor

THE IMPERIAL BRASS MFG. CO., 517 S. Racine Ave., Chicago 7, Ill.

IMPERIAL

Pioneers in Tube Fittings and Tube Working Tools

THESE EXTRA MAN HOURS GAINED BY USING A LORAIN

● These figures came from an Ohio foundry. They show the savings in man hours—in dollars—in space—that began to pile up as soon as their Lorain went to work. On the next trip through your plant and yard, take time to spot operations such as shown, then check on the man hours a Lorain Crane can save you.

Lorain Cranes for industry are available in three mounting types ... Crawlers, Self-Propelled (single-engine) rubber-tire mountings, or 30 mph (two-engine) Moto-Cranes. Capacities from 6 to 45-tons. A call to your nearest Thew-Lorain Distributor will bring you helpful facts in a hurry!

THE THEW SHOVEL CO.
LORAIN, OHIO

SAVED 36 MAN HOURS PER CAR

unloading scrap from cars to stockpile with a magnet.

SAVED 13 MAN HOURS PER DAY

loading scrap from stockpile to charging boxes.

SAVED 28 MAN HOURS PER CAR

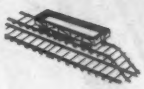
unloading sand from cars to stockpile when changed to clamshell.

SAVED 21 MAN HOURS PER 60 TONS

loading sand from stockpile to trucks or hopper.

PLUS **THESE SAVINGS IN DOLLARS AND SPACE**

SAVED $300-400 PER MONTH



in railroad car demurrage rates — by faster unloading.

SAVED ON SCRAP PURCHASES

by eliminating need for *premium* scrap suitable for hand shoveling.

MORE YARD SPACE USABLE

Scrap storage area increased 10 times, due to greater area covered by crane.

SAVED 7500 SQ. FT. FACTORY SPACE

Crane permitted outside storage of heavy flasks — released 7500 sq. ft. of factory for production.

THEW **LORAIN** LORAIN CRANES FOR INDUSTRY

You can stretch a V-BELT just so far... and we do it!

THE CORDS in every U. S. Rubber V-Belt have had their stretch worked out by mechanical means. These cords are placed over sheaves of prescribed diameters and at controlled tensions, which insures minimum stretch in the finished belts. Enough elasticity is retained in the cords to enable the belt to withstand severe shock loads, yet permanent stretch is held to a minimum.

To reduce any functional heat generated by constant flexing, and to get maximum adhesion between the component parts of the belt, the cords are treated with latex.

Of course, each belt has that unique development which provides efficient pull and strength under diverse operations—the Equa-Tensil Cord Section. Protective jackets increase the grip while keeping out the dirt and prolonging wear. Order from your jobber, or for more information write to address below.

Top rubber cushion in closely engineered balance with the lower section . . . to keep cool under constant stretch and turn.
Equa-Tensil Cord Section – all cords scientifically placed, each pulling its share of the load.
A sturdy level cushion for the Equa-Tensil Cord Section provides structural firmness for V-grooves and over the flat pulley of V-to-flat drives.

MULTIPLE V-BELTS
F.H.P. BELTS • FAN BELTS
FARM IMPLEMENT BELTS
SPECIAL PURPOSE BELTS

PRODUCTS OF
U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

HKP
PORTER
HANDKLIP
6C WIRE
CUTTER

For FREE CUTTING of wires, cable, rods, baling wire and bolts up to medium hardness.

One of the handiest, most useful cutters ever made. Parrot-beak jaw quickly locates material for easy cutting. Protruding tip of jaw prevents wire from slipping, aids in stretching wire and is great for pulling out staples.

Essential equipment for cutting high tensile communication and power wires used in rural electrification (Model 6B with special hard cutting edges). See your supplier.

H. K. PORTER, INC.
Somerville 43, Mass.
Porter Cutters Porter Pruners
PORTER-FERGUSON Autobody and Fender Repair Tools

after you've read this magazine

. . . and clipped pertinent ideas, articles and advertisements for reference, *please do not burn or throw it away.*

Here are two sound reasons why:

1) Wastepaper can help to swell the funds of your local Boy Scout Troop, your church or other community organization. It gets a good price these days.

2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

Collect it. Give it to your favorite organization. Chances are they have scheduled pick-ups.

Largest Exclusive Refrigerator Manufacturer reports:

50% SAVING IN MATERIALS

for office floor care since switching to the

MULTI-CLEAN METHOD

About a year ago the Seeger Refrigerator Co., St. Paul, Minn., began treating their asphalt tile floors with Multi-Clean Asphalt Tile Preserver. This single treatment (no wax used) is applied four times a year and replaces wax applications which were necessary two and three times a month to achieve the continuing beauty and cleanliness desired.

"Now we have good looking floors all the time," says the Maintenance Director, "yet we spend 65% less time maintaining them, and have cut our material costs in half."

THE MULTI-CLEAN METHOD APPLIES TO OLD AND NEW ASPHALT TILE FLOORS, adds years to their life, imparts a new beauty-clean appearance and sure footing. The Seeger offices including a hospital and cafeteria, represent nearly 20,000 sq. ft. of old and new asphalt tile, and the same easy, economical Multi-Clean Method is applied to both.

(A) APPLICATION: A thorough scrubbing with the floor machine and No. 0 steel wool pad precedes each application of Multi-Clean Asphalt Tile Preserver.

(B) MAINTENANCE: Dry dust mopping daily; damp mopping with cold water followed by machine buffing with No. 0 steel wool pad every 3 to 4 days.

(C) RESULT: Beautiful, clean, anti-slip floors packed with service and long wear.

FREE—FLOOR MANUALS

Handy reference file size, each manual deals with a specific floor and its proper care . . . asphalt and rubber tile, terrazzo, concrete, wood, linoleum.

Multi-Clean Floor Machine

Multi-Clean Wet-Dry Vacuum

MULTI-CLEAN®
PRODUCTS, INC.

Multi-Clean Products, Inc.
2277 Ford Parkway, Dept. 34G, St. Paul 1, Minn.

Gentlemen: Tell me how I can cut my floor maintenance costs. I would like the floor manuals on:

_____ floors.

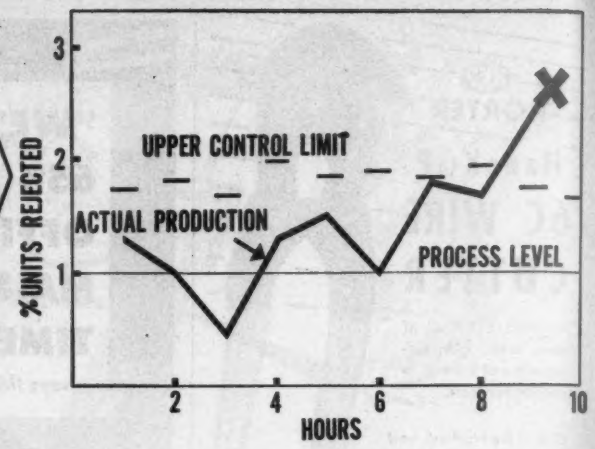
Name _____

Address _____

City _____ Zone ____ State _____

Custom Cleaning Chemicals • Floor and Rug Machines • Permanent Floor Finishes • Industrial Vacuums

YOUR PRODUCTION IS OUT OF CONTROL WHEN THIS HAPPENS



QUALITY-CONTROL INDICATOR

Instantly Indicates—when upper control limit is exceeded, enabling you to act at once to stop rejects. It also pinpoints where the trouble is occurring. You set your own control limits.

If you have a quality-control program, you will be glad to know that the G-E Quality-Control Indicator gives you a continuous control chart automatically, enabling you to spot trouble *as it occurs.*

If you don't have a quality-control program yet, you can now get the best at the lowest cost. For more facts about the first and only automatic, instantaneous quality-control, call your G-E sales office or write for bulletin GEC-629 (Section 687-63), General Electric Company, Schenectady, New York.

PRICED FROM **$530.00** LIST

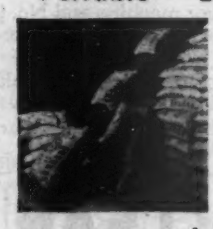
GENERAL ELECTRIC

687-63

Faster Handling Lower Cost with HYTROL

FOLDING CONVEYOR

Portable — Low-Priced — Versatile



Handles boxes, bags, bales, bundles and cartons • Compact—folds to half its size • Can be taken into freight cars for unloading • Elevates to any angle while in use • Made in 5 sizes, 10′ to 20′ long • Widely used for between-floors handling jobs • Loading end near floor—saves lifting • All moving parts concealed to protect operator and products • Controls hydraulically operated • Flow of materials can be reversed by turn of a switch • Welded steel construction • Stacks bagged products four times as fast as manual method • GUARANTEED against faulty materials and workmanship. For complete information and prices, write Seedburo Equipment Company, 7011 Converse Bldg., Chicago 6, Illinois.

SEEDBURO CHICAGO

Exclusive Distributors for Hytrol Conveyors

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

No. 1800 DETECTO-GRAM INDICATOR HEAD

One more Detecto weighing instrument to speed production. This attachment converts your present beam scales to accurate weighing equipment. Indicator stops instantly at correct weight.

Write for circular.

DETECTO SCALES • INC.

MAKERS OF FINE SCALES SINCE 1900

845F PARK AVE. • BROOKLYN 5, N.Y.

SCALE ENGINEERS IN ALL PRINCIPAL CITIES

Kimpak* Float Packaging

DINING TABLE
Surface Protection

Cuts shipping costs— reduces damage in transit!

Does the product you make get the best possible shipping protection on its way to market? Does your packaging operation move quickly—with minimum demand on labor and material?

A vigorous "yes!" is answered by the scores of companies that investigated—and changed—to KIMPAK* Float Packaging. For it's the world's most effective cushioning protection, at lowest true cost.

KIMPAK creped wadding is a pre-fabricated, grit-free material available in many thicknesses. It's soft, clean, easy to apply as wrapping paper. Regardless of the type of product you ship—you'll find a specification of KIMPAK designed especially to protect against countless shipping hazards. It cannot mar or chemically affect any type finish—protects against scratching, rubbing, press-marking. And because KIMPAK is not a waste material, but comes in rolls or sheets, it can be "tailored" to meet your particular requirements.

Try KIMPAK soon—for any of the Four Basic Methods of Interior Packaging: Bracing and Blocking, Flotation, Surface Protection, Absorbent Packaging. For further information, see your nearest KIMPAK distributor listed in classified telephone directories under "Packing Materials" or "Packing Materials—Shipping"; or write to Kimberly-Clark Corporation, Neenah, Wisconsin.

Kimpak
REG. U.S. PAT. OFF. & FOREIGN COUNTRIES
A PRODUCT OF Kimberly Clark RESEARCH
CREPED WADDING

*T. M. REG. U. S. PAT. OFF. & FOREIGN COUNTRIES

1. Pre-cut blanket of KIMPAK is laid over entire top of table.

2. KIMPAK blanket firmly taped in place protects all edges and corners of top.

3. Without further packaging protection, table is now ready for truck shipment to any part of the country.

Dining table illustrated is a product of the Rway Furniture Company, Sheboygan, Wisconsin.

FREE BOOKLET!

KIMBERLY-CLARK CORPORATION
Neenah, Wisconsin FM-551

Please send me free, the illustrated KIMPAK booklet, "Float Packaging."

Name _____

Address _____

City, Zone, State _____

Republic Tips

to Conveyor Belt Users . . .

1. SELECT PROPER TYPE BELT CONSTRUCTION

. . . a job for your Republic Distributor

REGULAR FOLDED CONSTRUCTION
(For general duty only)

STEP PLY CONSTRUCTION
(Gives better troughing action)

BREAKER STRIP CONSTRUCTION FOR EXTRA PROTECTION
(Against Heat or the Effects of Heavy Abrasive Loads)

NOTE: Conveyor Belt wear is generally greater at the edges and lower outside surfaces—Extra cover thicknesses at these points give Republic Belts added protection.

It takes more than a conveyor belt purchase to reduce your material handling costs.

The belt must be constructed right, installed right and serviced right.

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He is prepared to make specific recommendations to save you time and money. Contact him today for a free analysis of your plant needs. He can quickly tell whether or not you're getting maximum benefits from present installations, and, if trouble exists, he's fully qualified to suggest corrective changes.

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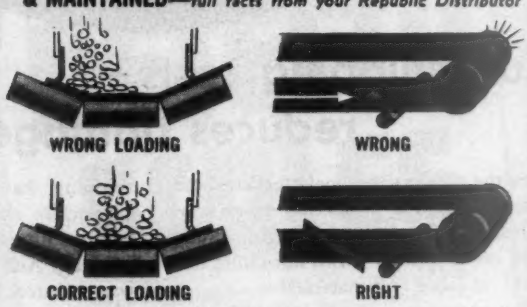
2. MAKE SURE YOUR BELT IS PROPERLY INSTALLED & MAINTAINED—*full facts from your Republic Distributor*



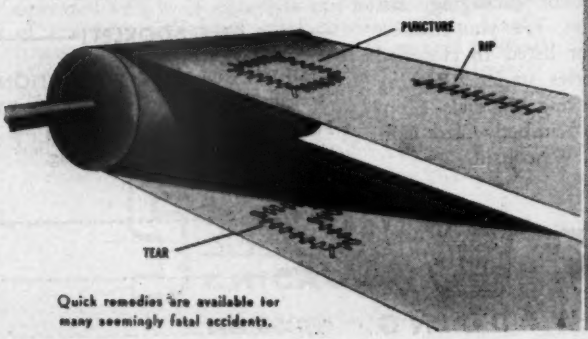
WRONG LOADING

WRONG

CORRECT LOADING

RIGHT

3. NEVER DISCARD DAMAGED BELTS WITHOUT CONSULTING YOUR REPUBLIC DISTRIBUTOR ABOUT POSSIBLE REPAIRING



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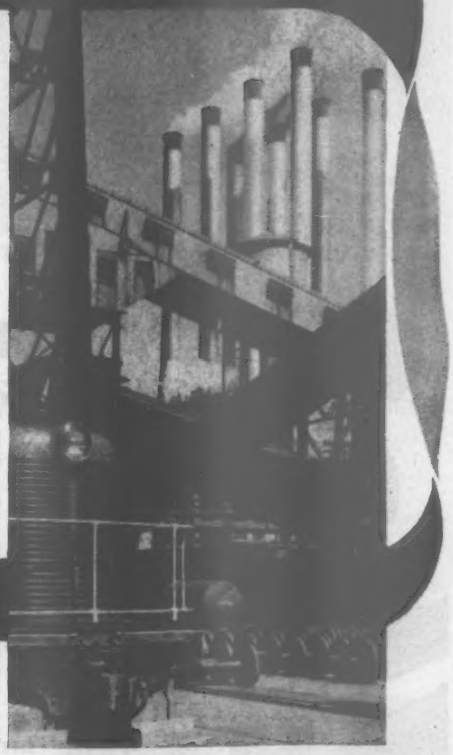

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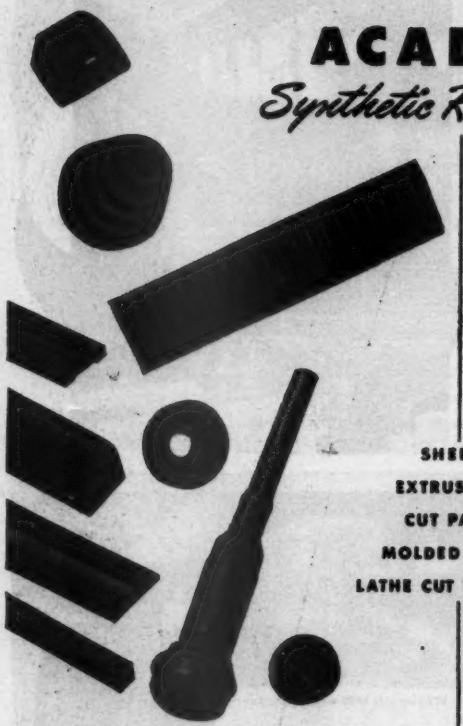

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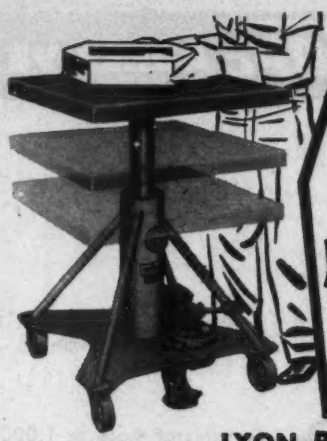

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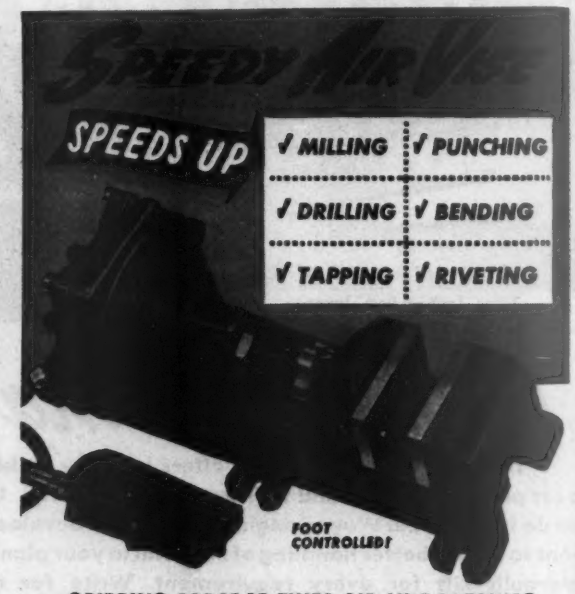

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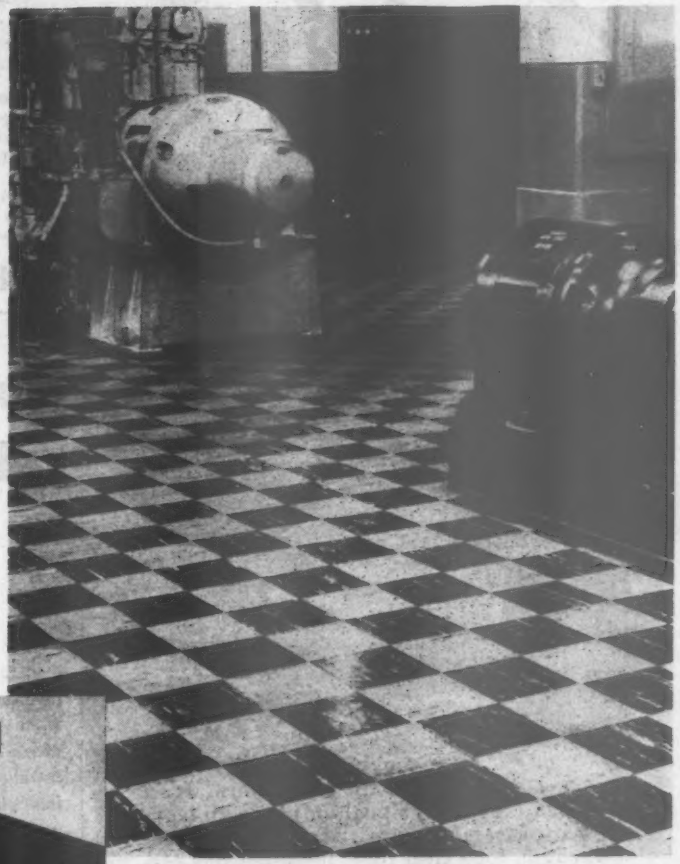

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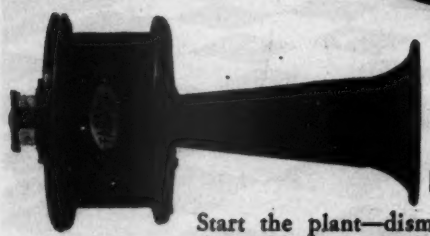

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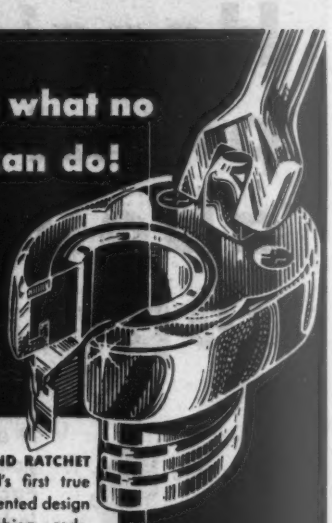

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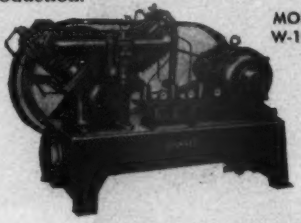

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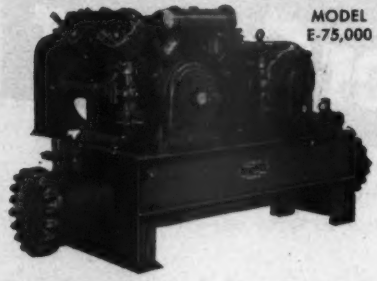

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(Continued on the opposite page)

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(Continued from opposite page)

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262	75	INGERSOLL ES-I 10 x 9
504	20	INGERSOLL ES-I 15 x 9
628	100	INGERSOLL ES-I 14 x 13
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W9380 Factory Management & Maint.
520 N. Michigan Ave., Chicago 11, Ill.

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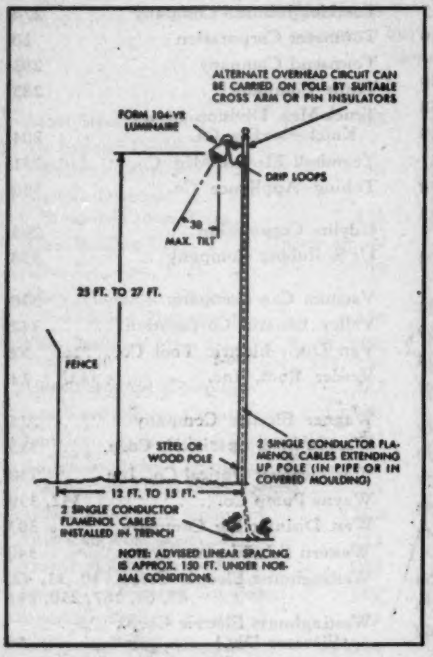
OUTDOOR INDUSTRIAL LIGHTING


ALTERNATE OVERHEAD CIRCUIT CAN BE CARRIED ON POLE BY SUITABLE CROSS ARM OR PIN INSULATORS
FORM 104-VR LUMINAIRE
DRIP LOOPS
30° MAX. TILT
25 FT. TO 27 FT.
FENCE
STEEL OR WOOD POLE
2 SINGLE CONDUCTOR FLAMENOL CABLES EXTENDING UP POLE (IN PIPE OR IN COVERED MOULDING)
12 FT. TO 15 FT.
2 SINGLE CONDUCTOR FLAMENOL CABLES INSTALLED IN TRENCH
NOTE: ADVISED LINEAR SPACING IS APPROX. 150 FT. UNDER NORMAL CONDITIONS.

HIGH VISIBILITY along the fence is obtained by using G-E Form 104 VR luminaires. These units are equipped with a Universal Bracket with either external binding posts or cable-inlet bushings for series or multiple circuits.

INTRUDERS can't penetrate this "wall of light" without detection. At the same time, 6,000 or 10,000-lumen lamps keep operating costs down to reasonable levels.

How to Get Extra Protection with Modern Boundary Lighting

If the boundaries of your plant need 24-hour protection, a well-planned lighting system adds a lot to security at surprisingly little cost.

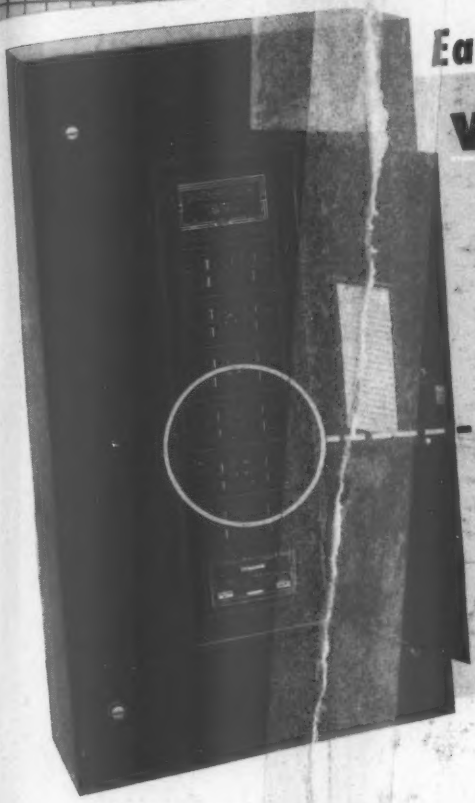
But it's important to get adequate illumination, for high visibility along the fence, without glare annoying to guards or adjacent property owners. The lighting must be effective in any weather, with safeguards against emergency outages.

A typical boundary-line installation uses G-E Form 104VR luminaries on 25-ft poles, 150 feet apart, as shown in the sketch above. Uniform two-way light distribution, with excellent lateral shielding, is the result.

To protect your plant property and to expedite plant traffic, illuminate loading platforms and parking lots. Whatever the need—General Electric has equipment matched to the job. The latest methods and layout guidance, too, are available to you from the lighting specialist at your local G-E office. You'll find valuable suggestions in the new bulletin, "Outdoor Lighting for Industrial Plants." For your copy, write Section 451-164, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

451-164



Easy to Add or Change Circuits

WITH THIS NMO "PLUG-IN" PANELBOARD

a "Natural" wherever a large number of branch circuits for lights, appliances and business machines must be switched and protected

1 SWING OUT...

2 OR LIFT OUT...

3 ATTACH WIRES...

4 "PLUG-IN"

Flexibility Four-circuit Multi-breaker units have "Plug-in" feature. Any combination of 15, 20, 30, 40, or 50 ampere circuits available. Dummy units can be inserted to anticipate future requirements. ***Easy to Wire***—Multi-breaker units can be swung or lifted out to attach wires. Approved connector eliminates "looping." ***Smaller Size***—Compact Multi-breaker unit permits more circuits and larger wiring gutters without increase in overall panel size. Better utilization of wall and column space.

THERMAL-MAGNETIC BREAKER UNITS GIVE 2-WAY PROTECTION

Thermal Element responds to heating effects of both load current and surrounding atmosphere. Total temperature is limited to a safe value.

Magnetic Element responds instantly to heavy overloads or shorts.

BOTH Elements are needed for COMPLETE Protection!

Illustrated NMO Bulletin SA567R gives complete information on the new Panelboards. Address Square D Company, 6060 Rivard Street, Detroit 11, Michigan.

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Built like an auto, Yale "Lift King" has TIMKEN® bearings of course!

THE Yale "Lift King" gasoline truck shown here uses several proved automotive design features for better performance. Fluid drive, heavy duty hypoid gearing, auto-type controls, brakes and steering mechanism—and Timken® tapered roller bearings, first choice of the automotive industry.

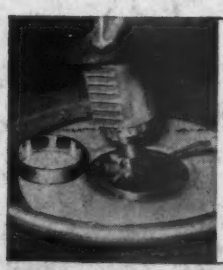
The "Lift King" has Timken bearings in the pinion, differential, steering wheels and drive wheels. Timken tapered roller bearings keep the shafts in precise alignment, the gears in close mesh. Wear on parts is reduced. The machine lasts longer and replacements are fewer. Bearing maintenance costs are reduced, too.

The tapered design of Timken bearings enables them to carry radial, thrust and combination loads. Line contact between rollers and races gives them the capacity for the toughest loads. Their true rolling motion and amazingly smooth surfaces virtually eliminate friction. And Timken bearings normally last the life of the machine because they are engineered for the job, made of Timken alloy steels, and precision manufactured.

No matter what kind of machines you make or use, always make sure the bearings are the best. Look for the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

H[illegible] YALE & TOWNE MANUFACTURING COMPANY mounts lift truck [illegible] on Timken bearings for smooth operation, low-cost maintenance and long life.



FINISHED TO CLOSER TOLERANCES

Finishing to incredible smoothness accounts for much of the precise, smooth rolling performance of Timken bearings. This honing operation is typical of the amazingly accurate manufacturing methods at the Timken Company.

The Timken Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

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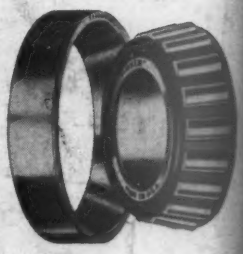
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION